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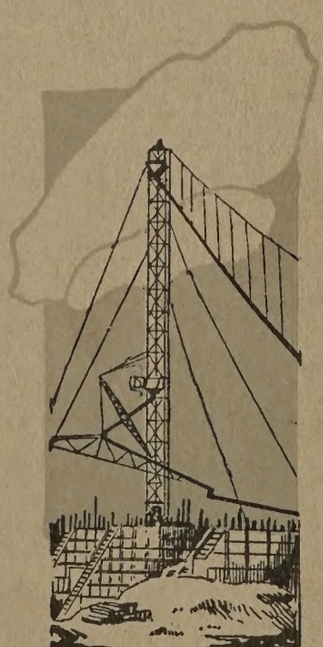
LAKEWOOD CONCRETE PLACING EQUIPMENT

BULLETIN 23-E



The Lakewood Engineering Co.
Cleveland U.S.A.

Bulletin 23-E

The Lakewood Engineering Co.

Cleveland, U. S. A.

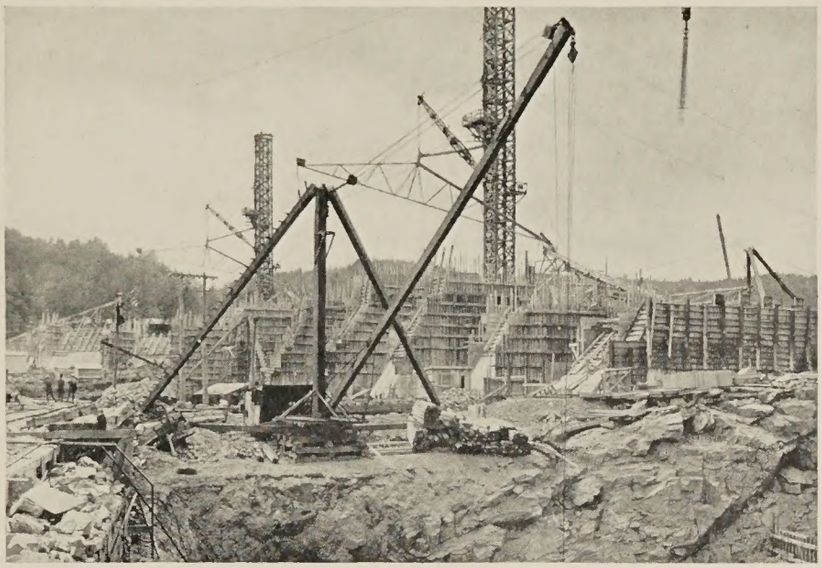
The Concrete Chuting Plant

A CHUTING plant may be used in two ways, it may be designed to deliver the concrete to floor hoppers at centralized points on the work, or the plant can be laid out for pouring direct into the forms. To determine which method should be used requires a study of each particular job.

There are three types of chuting plants in use. First, the Boom Plant; second, the Unit Plant; third, the Continuous Line Plant. Of course, there are various possible combinations of the three types, but as a general rule boom and unit plants apply almost entirely to building work and the continuous line plant to dams, bridges and work of that character. The various types of plants are illustrated on the opposite page.

In general, a chuting plant consists of an elevator bucket, which operates in a tower and a tower hopper, which may or may not be mounted on a sliding frame and the necessary chutes for covering the job. A properly laid out chuting plant should produce a marked saving in time and labor. The amount of concrete which can be placed is limited only to the capacity of the mixing plant and the forms available. The point of pouring can easily be diverted from point to point without it being necessary to take up and replace runways. More continuous operation of the mixing plant will be secured which naturally means more economical operation. Furthermore, on a construction job, due to local conditions, it may be impossible to locate the mixing plant exactly at the building or perhaps the concrete has to be carried over a stream or other obstruction. On such jobs, the chuting plant provides a method for solving the problem economically.

The chuting plant can no longer be considered a one job installation. It is durable and easy to move—it is composed of standard, interchangeable parts which can be fitted and rearranged to meet practically any job requirement. The interchangeability of the various units also means quicker and easier erection and it is important in purchasing a chuting plant to see that interchangeability of parts is secured. It is a feature which Lakewood Chuting Equipment assures. Again, the chuting plant is really a machine and to secure the results desired, must be correctly applied to the work at hand and properly operated.

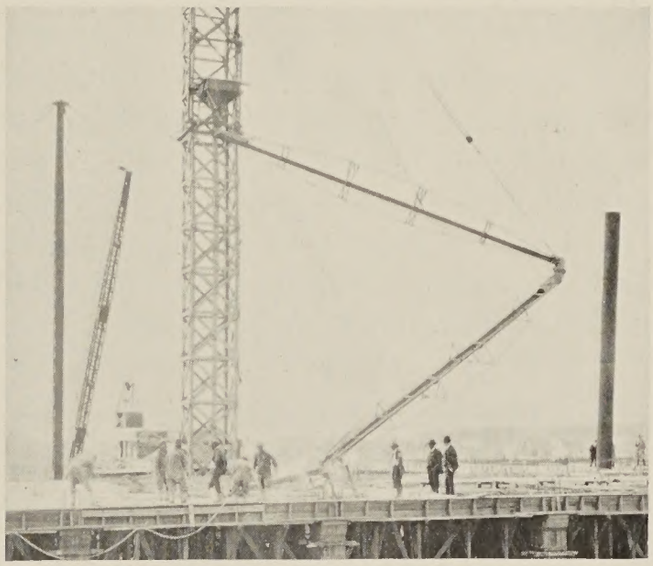


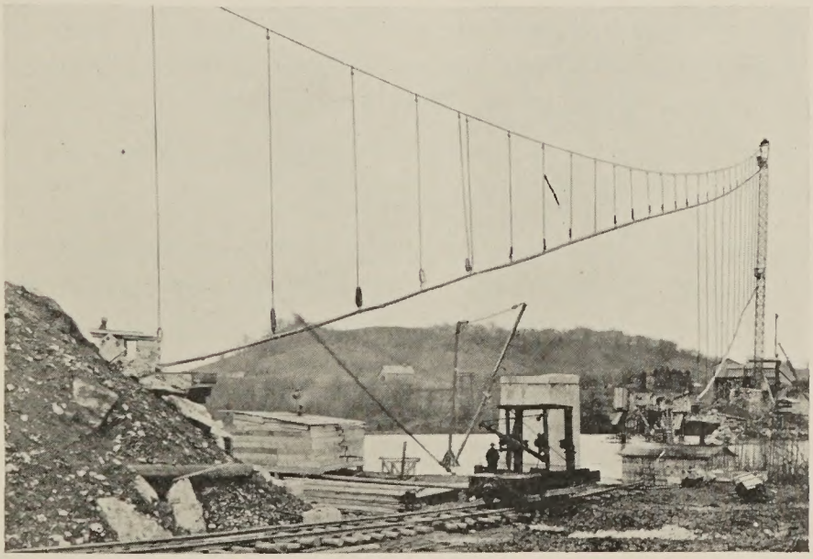
BOOM PLANT

On the boom type of plant the peaking line connection and steel boom seat are all mounted on a steel sliding frame with the tower hopper—the first section of chute runs through an opening in the boom and does not require trussing. This type of plant is used principally with Counterweight chutes on either wood or steel towers, but can be used with plain sections if desired.

UNIT PLANT

The Unit Plant combines the steel boom with the first section of chute. Altho this requires a slightly higher tower, the plant is easy to erect and simple to operate. The operation of the Unit Plant is much like a gas jet. When the pouring end of the second section is moved the balance of the plant finds its own position. Counterweights can be used with the Unit Plant as well as with the Boom Plant.





CONTINUOUS LINE PLANT

The Continuous Line Plant has many variations. It may be simply a straight line of chute or line gates may be installed at various points for distributing the concrete to points under the chute line. Many times an economical combination is a continuous line chute with a Counterweight at the discharge end of the line for distributing the concrete.

The Lakewood Engineering Company
Cleveland, U. S. A.

The Concrete Chuting Plant

Consistency of the Concrete:

The general statement is sometimes made that to chute concrete, an extremely wet, sloppy mix is required. As a matter of fact, a very sloppy mix will cause continuous trouble with any chuting plant for the reason that the mix separates in the chute, the grout leaving the heavier aggregates stranded, thus causing clogging. Practical experience with hundreds of chuting plants has proved that a good, creamy, workable mix is the one which can be handled the easiest in a chuting plant, providing the proper slope for the chute is maintained and that excessively wet batches or flat chute lines are almost entirely responsible for difficulties experienced with a properly laid out plant. Concrete varying in slump under the standard "slump test" from 3″ to 6″ can be handled satisfactorily in chutes.

Slope of Chute Lines:

For chute lines not over 175 ft. in length, a slope of not less than one to three is recommended and on that slope, a good concrete mix can be handled satisfactorily in all respects. On lines longer than 175 ft., we recommend a one to two and three-quarters to a one to two and one-quarter slope, depending upon the capacity desired, the length of the line, and the type of aggregate used. It has been demonstrated that concrete much drier than that ordinarily used on building construction can be placed with chutes on the slopes as outlined above.

Relationship in Size of Buckets, Hoppers, Etc.:

There is a general rule covering the size of bucket and hopper to be used with a given size of mixer which, in general, can be stated as follows: The working capacity of the elevator bucket should correspond with the wet batch capacity of the mixer. The tower hopper should have at least fifty per cent greater working capacity than the bucket to provide extra storage capacity in case of a hold up of the concrete. All Lakewood elevator buckets and tower hoppers are rated on a conservative working basis and have a considerably larger water level capacity as reserve.

Capacity and Length of Life:

Lakewood standard chute has a body of twelve gauge plate and a greater cross sectional area than any other type. It gives in addition to its greater capacity, forty per cent more wearing thickness of body than chutes made of 14 gauge plate. The

The Concrete Chuting Plant

life of a chute section, of course, depends on so many variables, such as the type of sand, type of heavy aggregate, care given the chute, etc., that it is quite impossible to make a general statement which will cover all cases. Chutes can be relined with liners of a thickness depending upon the yardage to be handled. Lakewood standard chute on an average slope will handle much more concrete under average operation than can possibly be mixed per hour by a one yard mixer.

The Steel Tower:

The fundamental feature of the modern chuting plant is the steel tower and it is justly so, for the steel tower is one of the most permanent and economical parts of the contractor's plant for placing concrete. The Lakewood Engineering Company was one of the pioneers in the development of the steel tower and the present Lakewood steel tower as described in this bulletin makes possible economies in erection and dismantling, greater layout possibilities and presents greater strength than ever heretofore secured with the standard steel tower. Made up of standard interchangeable sections, it can be varied in height as conditions demand; it can be erected much easier and quicker because it is framed and punched to template; it has greater rigidity and strength than the average wood tower under similar conditions, and, most important of all, it will outlive fifteen to twenty jobs or even more with proper care as to painting and storage. Records are available of Lakewood steel towers built over ten years ago which are still in active service on construction work, without repairs, with the exception of new bolts.

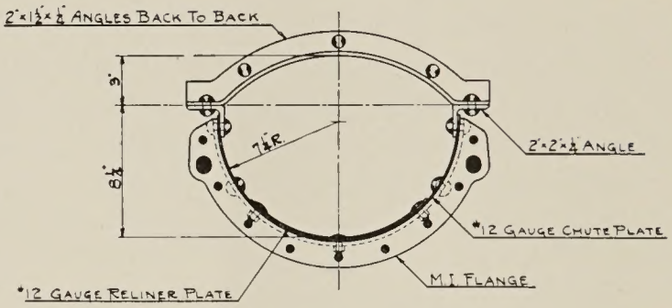
Factors of Success:

The success of a chuting plant and the satisfaction with results secured from it, both from the contractor's and the engineer's standpoint are dependent upon certain definite things—first of all, a good, workable, creamy mix of concrete, not a sloppy extremely wet mix. Second, securing as nearly as practicable, the same consistency of concrete, batch after batch, from the mixing plant. Third, an experienced, capable man regulating the flow of concrete into the line from the hopper and, fourth, a properly laid out plant. The importance of this last item cannot be underestimated.

The experience of Lakewood engineers with chuting plants covers practically all types of concrete construction. They will be glad to cooperate in any way possible on layout work and such cooperation involves no obligation upon those requesting it.

The Use of Large Aggregate in Chuting Plants

THERE is an increasing demand for greater hourly capacity in chuting equipment and also for a chute which will handle aggregate running to 6″ and 8″ in size. This is particularly true of dam construction, a type of construction upon which a chuting plant is generally a most valuable unit. To meet these requirements, there has been developed a modification of standard Lakewood chuting and also a special chute, 18″ in diameter.

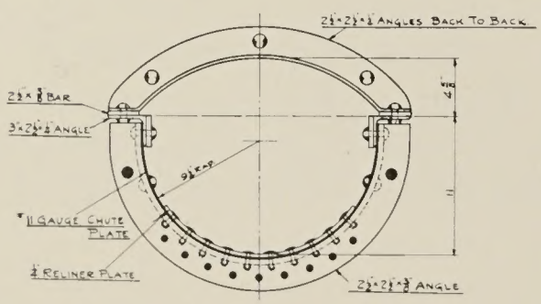


Lakewood 14″ Chute with Arched Cross Bands.

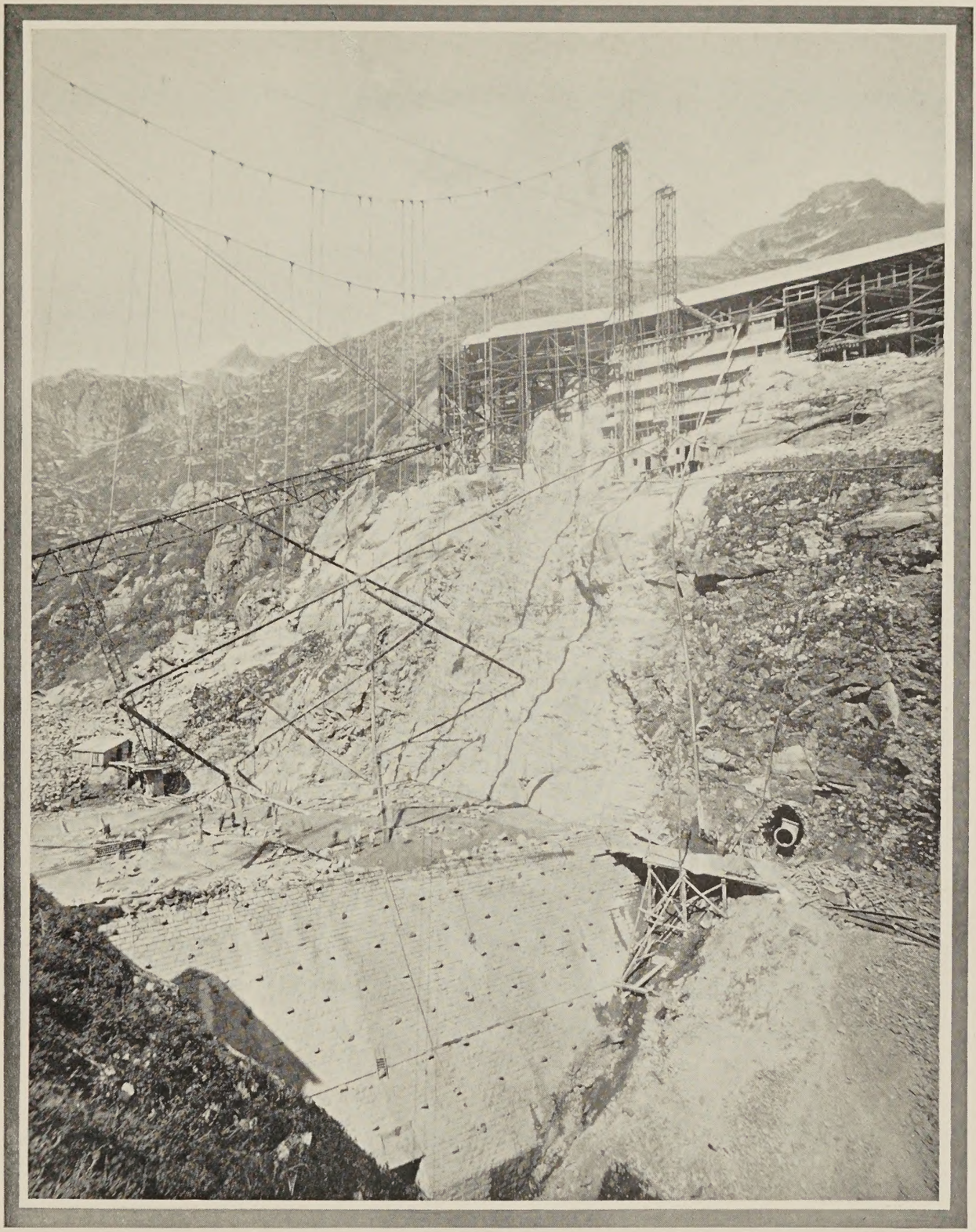
For the small dam projects and for heavy mass concrete jobs, Lakewood standard chute with arched bands and reliners is furnished similar in all respects to the cut at the top of the page. Standard Lakewood chute has a greater capacity than any other standard type of chute and when equipped with the arched bands and heavy reliners, makes an ideal unit for handling the larger jobs and large aggregate—Lakewood chute, so equipped, on a 1 to 2¼ slope, will handle all the concrete which can be supplied by three one-yard mixers working under average conditions, and it is particularly fitted for the large aggregate because of the Lakewood elbow connection and the shape of the chute itself. The Lakewood elbow connection gives a 14″ diameter full circle, with all working parts on the outside of the connection, thus eliminating the clogging always experienced with large aggregate with other types of chute connection, while the half round section of Lakewood chute eliminates the tendency of large aggregate to wedge and clog in the bottom of the chute, as it will do in the narrow egg shape sections. Chute of the type just described is in use on the jobs pictured on pages 8, 9, 10 and 14.

Where unusually hard aggregate is to be used or where enormous yardages are desired without taking the chute down for relining, $\frac{3}{16}$″ reliner plates are recommended. Reliners of this thickness were furnished on the jobs shown on pages 8 and 10 and records are available of their handling 75,000 to 125,000 cubic yards of concrete without relining. These heavy reliners are bolted into the chute and are intended for use in long continuous line chute or counterweight sections but not in the sections which must be continually moved by workmen as the pouring progresses.

The 18″ Lakewood chute is intended for those dams and larger concrete projects where two or more 56-S mixers are to be used. It is identical in cross section and general construction to the arched band standard chute except changed as to the weights of material and general dimensions. The photographs on page 10 shows a job equipped with this 18″ chute, it is practically always equipped with $\frac{3}{16}$″ reliners. Only 20 foot continuous line with 30′ and 50′ counterweight chute sections are furnished in this size of chuting equipment.



Lakewood 18″ Chute with Arched Bands.



THE chuting plant above consists of two main towers at the mixing plant with a combination of continuous line chute and counterweight sections. The elevation of the mixing plant was such that no towers were required for the first part of the work. By the use of line gates in the main chute lines, four distinct lines of pouring are secured, two of which are visible in the view shown. Thus the entire area of the dam was covered by simply manipulating the counterweight sections without changing the main lines. Each main chute line handles the output of two 1-yard Lakewood mixers. The working season at this elevation is very short and the chuting plant has done much to make the unusual progress secured on this job possible. This work is in the Swiss Alps.

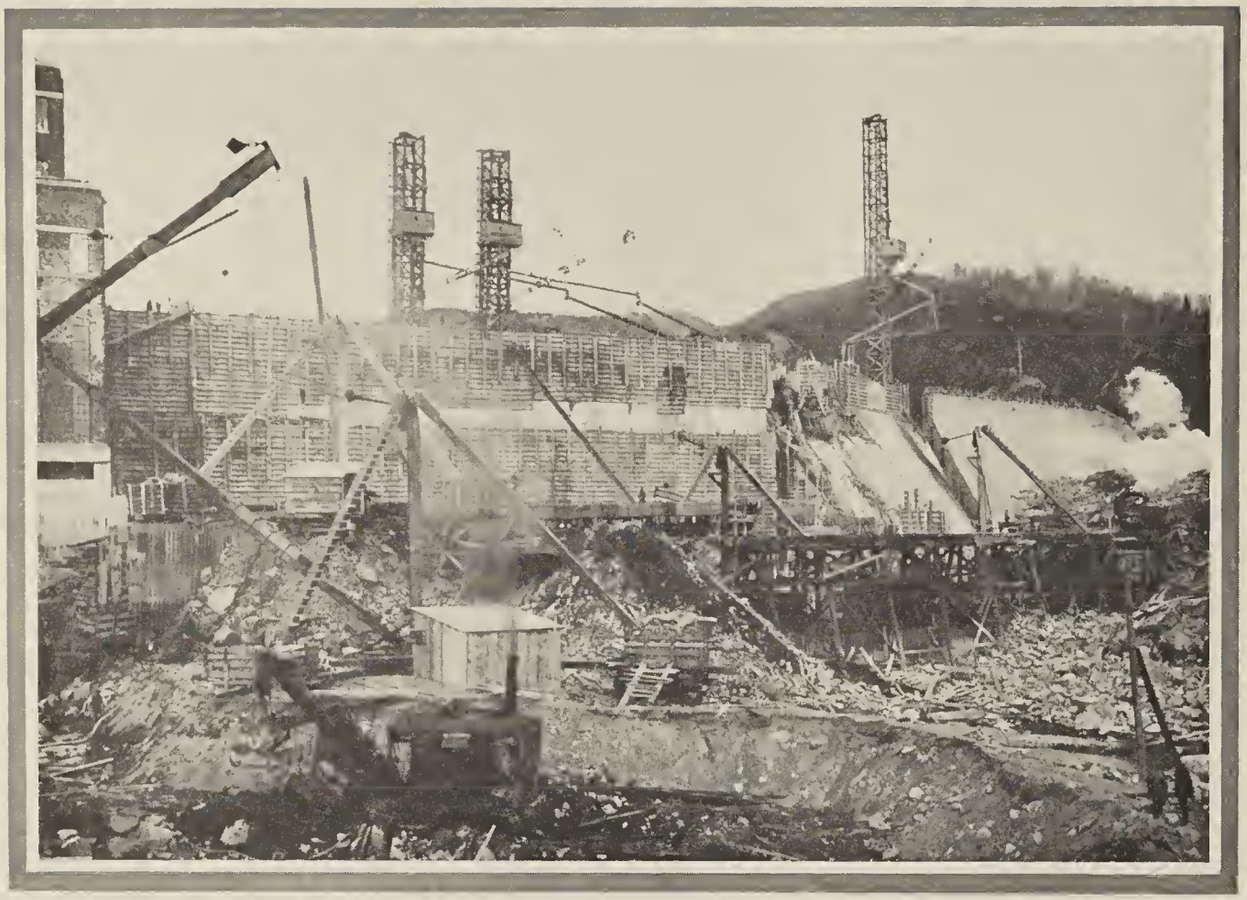
The Lakewood Engineering Company
Cleveland, U. S. A.

The Phoenix Utility Company, Duluth, Minn.

A LAKEWOOD installation on a hydro-electric power development in Minnesota. Three one-yard mixers were placed at the base of the towers. The towers are each standard 240-ft. Lakewood steel towers, latticed together, which, on other jobs, may be used separately, as each is complete in itself. Continuous line chutes, in combination with a double counterweight were used to place the concrete within six hundred feet of the towers. The tower hoppers are arranged on sliding frames so that the chute line takes off from the lower hopper, the concrete from the upper hopper flowing thru the lower hopper to get into the line. The chute on this job is similar to that outlined on upper half of page 6 and is equipped with $\frac{3}{16}''$ reliners. This standard arched band chute has at all times taken care of the mixing capacity available on this job.

ANOTHER installation on dam construction in the Alps of Switzerland. Four one-yard Lakewood mixers make up the mixing plant. For the first three years' work (there is a very short working season at this elevation) no towers will be required; the mixers discharging directly into hoppers which feed the chute line. Two lines of chute were used as shown; a line to two one-yard mixers. The chuting plant was a combination of continuous line and counterweight sections similar in capacity to that described on the upper half on page 6. The crest of the dam will be at about the base of the mixing plant—two steel towers will be used for completing the work to the crest. Note particularly the rig up of the chute line required for the drop to the base of the dam, and the fact that each line of this Lakewood chute has capacity enough to handle the output of two one-yard mixers.

The Lakewood Engineering Company
Cleveland, U. S. A.



The Shawinigan Engineering Co., Montreal, Que.

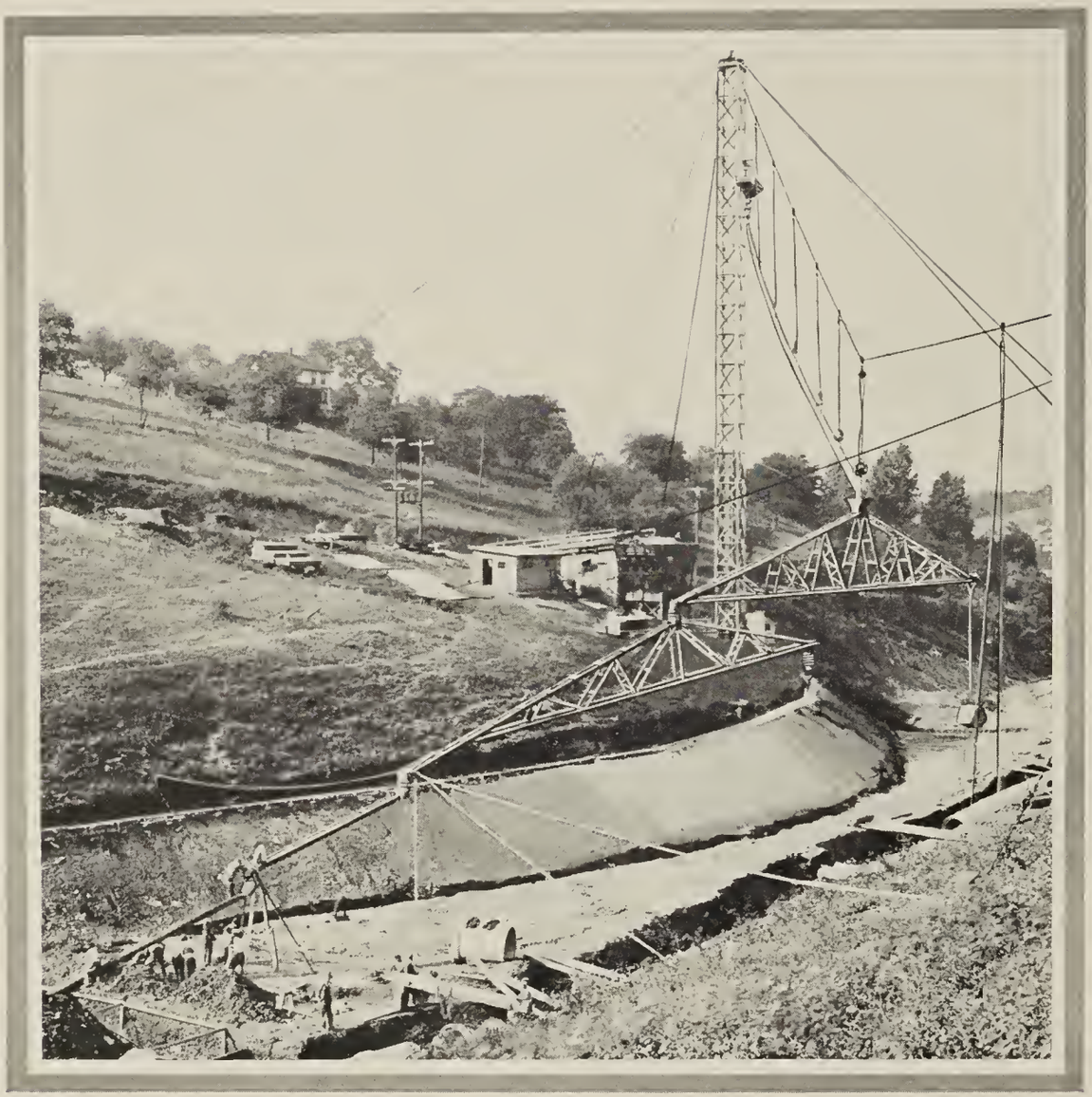
ON the above job, three towers were erected, each one supporting a 150-ft. Lakewood boom counterweight plant. Each plant covered 300-lineal feet of the work. All the concrete was mixed at a central plant at a distance of 1500-ft. and hauled in bottom dump cars to the base of the towers, where it was elevated and placed in the forms. The contractor's own words tell the story:

> *"In this connection, I think it is quite sufficient to simply state that your chutes have poured 149,000 yards of concrete during the last seven months of 1923. They have given us entire satisfaction and for similar work such as we are doing here I do not think better performance could be asked for."*

These plants were made up of 14" Lakewood arched band chute equipped with $\frac{3}{16}$" reliners as described on page 6.

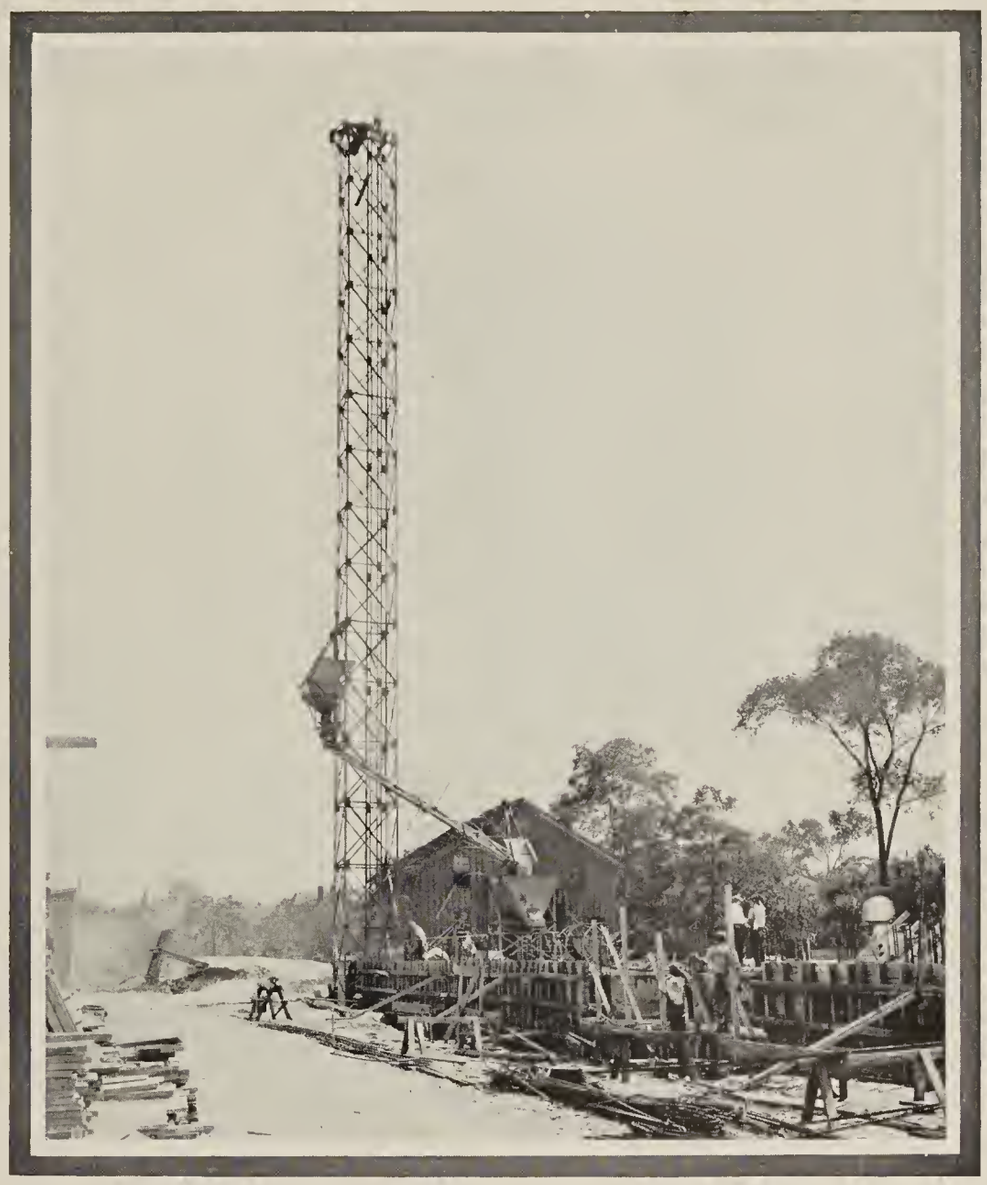
The Hugh Nawn Company, Gilboa Dam, N. Y.

THE dam shown above involved placing approximately 350,000 cu. yds. of concrete. Two Lakewood two-yard mixers were placed at the base of the double tower shown near the left hand side of the page in the view above. Concrete was chuted in both directions from this main tower and was re-elevated to carry to the far end of the dam. For the main chute line between the two towers, 18″ Lakewood chute was used, similar to that shown in detail on page 6. Fourteen inch chute was used for distributing lines. Line gates in the main 18″ line were provided for distributing the concrete at various points on the dam between the main towers. Enormous daily yardages were secured from the two two-yard mixers but at no time was the 18″ chute crowded to capacity. This job presented a particularly hard layout problem due to its unusual length, but the chuting plant solved the problem.



General Construction Securities Co., Pittsburgh, Pa.

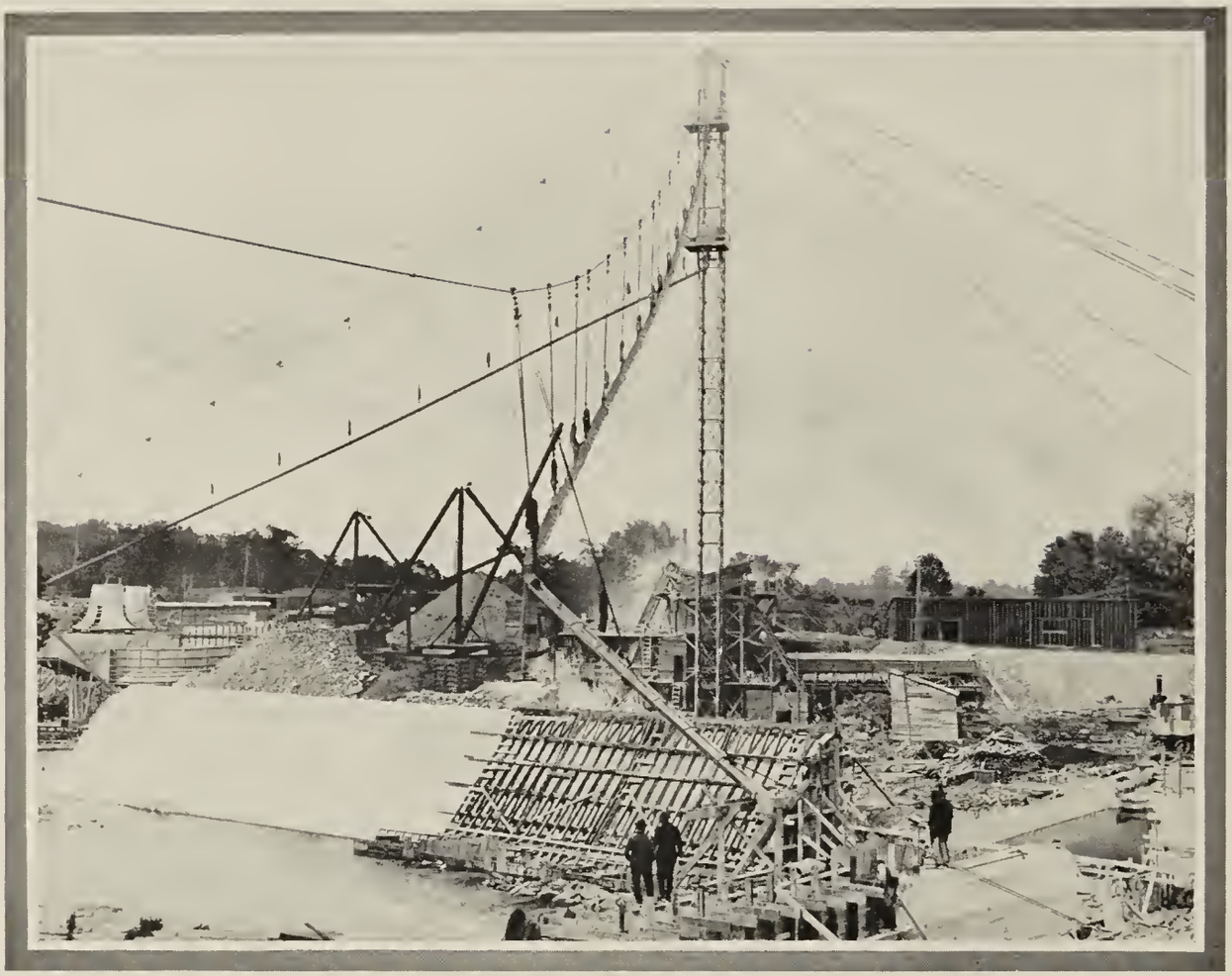
ON filtration plants, reservoirs and mass concrete jobs where the bulk of the concrete is below or just slightly above ground level, the double counterweight plant provides a very satisfactory method for handling concrete. The advantage of the double counterweight system lies in the fact that from a central point it will cover an unusually large area largely eliminating supports and thus making it easier to move the plant from point to point. The plant above is a very good example of such an installation. In this plant, which includes a 150-ft. steel tower, the double counterweight is suspended from an overhead cable and from this set up an area 320-ft. in diameter was covered. Many times a derrick is used rather than a cable for supporting the counterweights as in the plant shown on page 16. The use of a single counterweight section with additional untrussed sections at the end of continuous line chutes many times meets all requirements.



The Crafts Construction Co., Cleveland, Ohio

MANY times a combination of chuting and carting is the most economical method for handling a job — the above installation illustrates this method. The construction of two buildings was involved and it was desired to handle the concrete for both buildings from one central mixer and tower. The tower was erected as shown and chute used to place the concrete in a floor hopper, from there it was carted to the forms. The chute could be swung about to either building as desired and eventually was lengthened by additional sections to aid in distributing. On this particular job, a half yard Lakewood mixer was used in addition to the Lakewood Steel Tower, chuting equipment and carts. Lakewood concrete placing equipment is complete for the small job as well as the large job, regardless of the method or combination of methods adopted as most economical for handling the concrete.

The Lakewood Engineering Company
Cleveland, U. S. A.

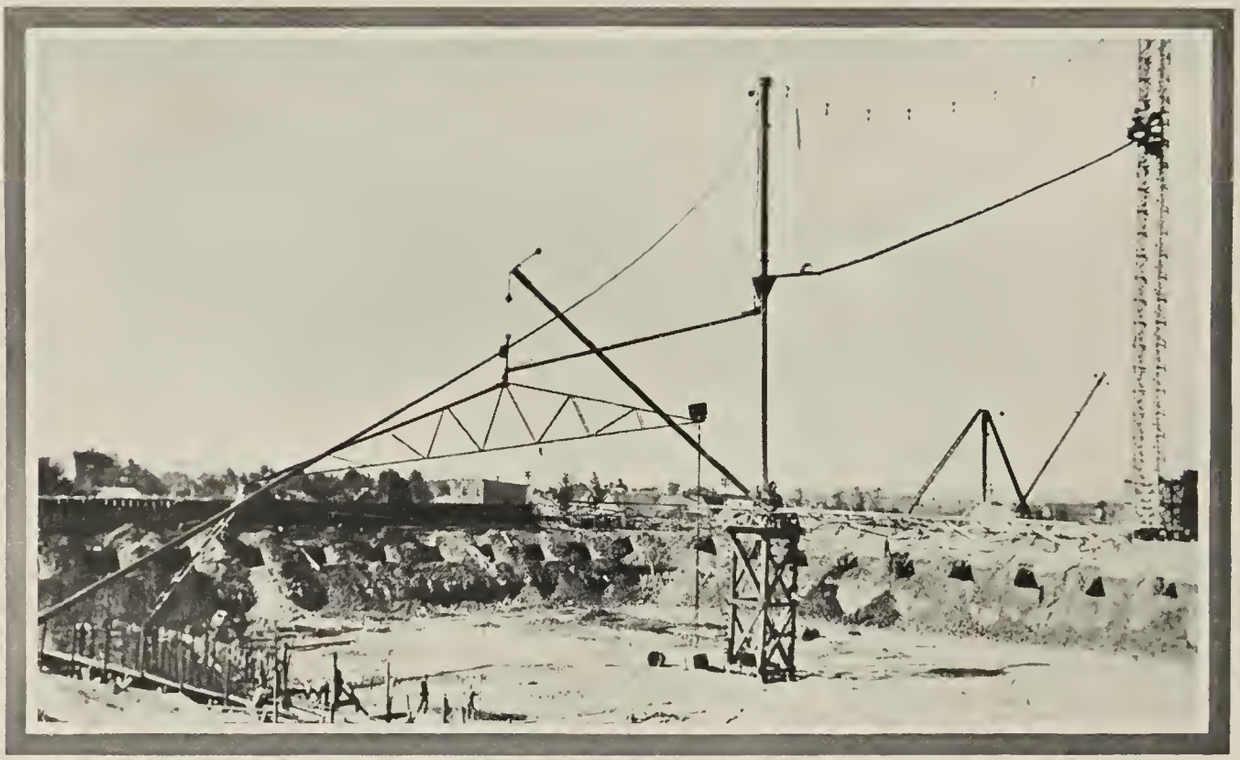


The Foundation Company, Carthage, N. Y.

IN the installation shown above, the arrangement for handling two lines of chute from the same tower at different elevations is the interesting feature. Concrete was desired at two widely separate points, requiring the use of approximately 600-ft. of chute and two supporting cables. A one yard Lakewood mixer was used at the base of the tower. The two tower hoppers were mounted on separate sliding frames and raised into position as shown. If it had not been necessary to chute farther in one direction than the other, the two chutes could have been attached to a two-way hopper switch as shown on page 50 and only one hopper used, making a more easily operated layout, as the bucket would have then been dumping at one point only. The chute on this job is the standard Lakewood chute with arched bands and 12 gauge reliners as shown on page 6.

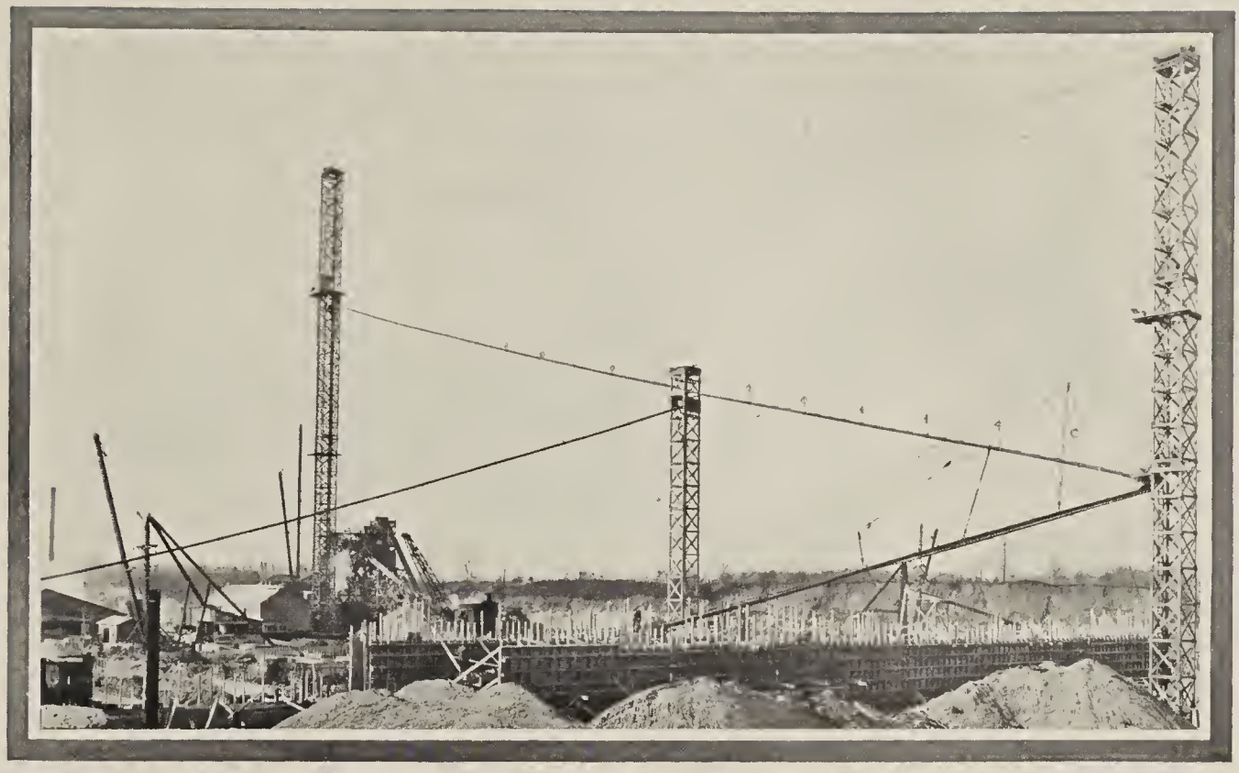
The Vang Construction Co., Cincinnati, Ohio

THE installation shown above was used to pour the concrete in the piers and approaches of a railroad bridge over the Ohio river. A 255′ one yard capacity steel tower and approximately 800′ of chute were involved. Concrete was chuted 760′ across the river and then the line was gradually shortened as the concrete was poured in the piers back towards the tower and mixing plant, as can be seen from the cut above. Two lines of chute were used. The long line and then a shorter line reaching to the piers near the tower, thus giving two points of pouring. The two chute lines were supported from the same overhead cable. Notice that chutes are supported to cable in 30′ lengths.



Snare & Triest, Perth Amboy, N. J.

THE plant shown above has many advantages but is particularly valuable on reservoirs, filtration plants and power houses. A continuous line chute is run out to a hopper mounted on the mast of a derrick as shown — this mast hopper is made in two parts and fastens rigidly to the mast, turning with it. Either a single or double counterweight can then be suspended from the derrick. The plant can revolve practically 360 degrees and eliminates chute supports which are, many times, troublesome. The use of a double counterweight (see page 12) would increase the diameter of the area covered by the plant 100-ft. On this particular job, two such units as shown above were used to pour the concrete in a reservoir which was 900-ft. long and varied in width from 230-ft. to 370-ft. The maximum area which can be easily covered with this type of plant is circular and 380-ft. in diameter.

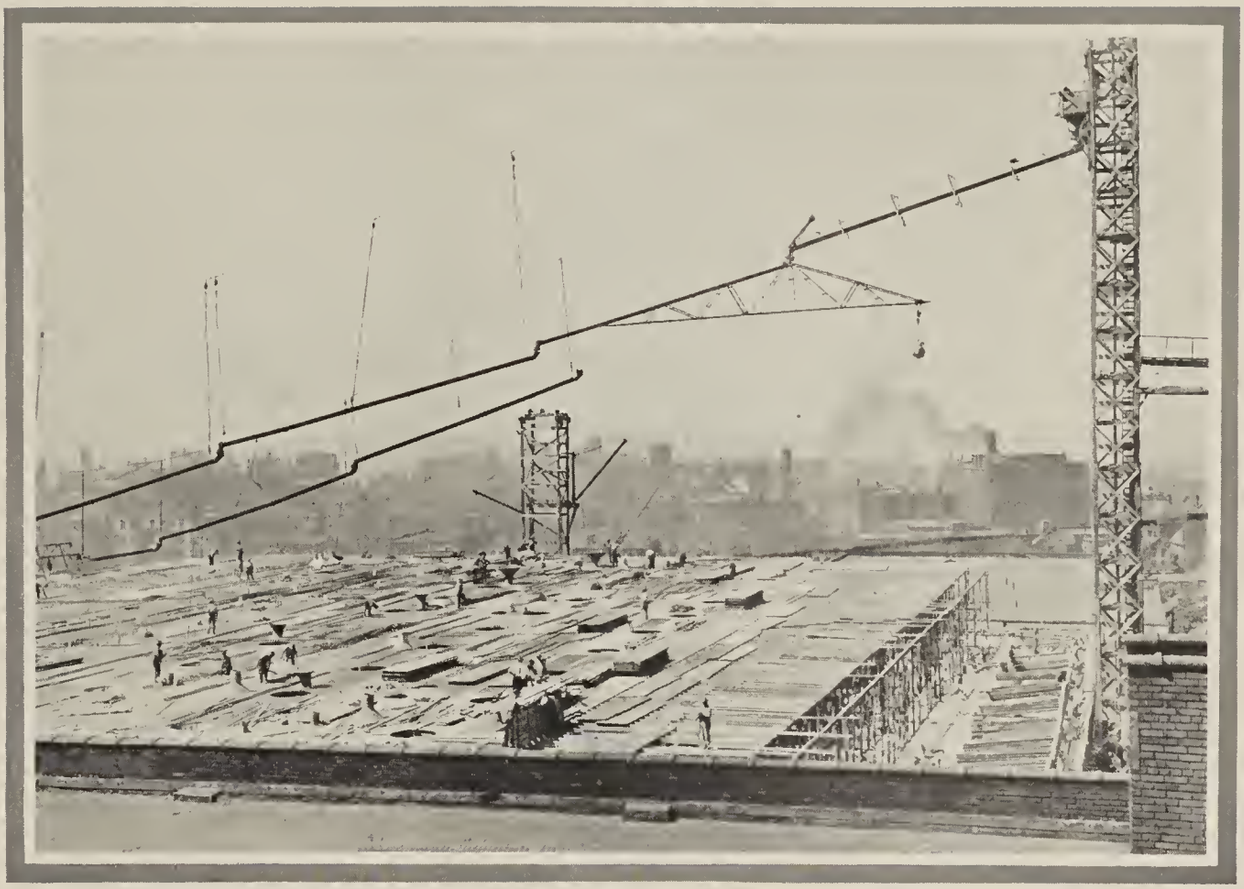


The Foundation Company, Mishawaka, Ind.

AN unusual power house chuting plant layout. Two towers were erected to support the main chute line. A shorter tower was then erected midway between them. The main chute line was run thru the top panel of this tower which supported a cable for another line of chute running out at right angles to the first line. Connection to the main chute line was made by a line gate placed at the top of the short tower. The main chute line then ran on to a two-way switch from which two additional lines of chute extended. This lay-out covered a very large area and provided three distinct points of pouring at any time without shifting the plant in any way. The greater capacity of standard Lakewood chute is very valuable on a job of this kind.

The General Contracting Corporation, Pittsburgh, Pa.

THE plant shown above was used on power house construction and consisted of a double counter weight boom plant suspended from a steel tower. The plant was not mounted on a sliding frame but remained fixed on the tower in the position shown. The second counter weight was of course supported at all times when concrete was being poured. The plant had a maximum reach of 180′ from the tower. Due to the unusual condition to be met on this job, this type of plant was the most satisfactory although very heavy. On jobs of this character which involve greater daily capacities and the placing of enormous yardages of concrete the longer life and greater capacity of standard Lakewood chute is a real advantage.



The Crowell-Little Company, Cleveland, Ohio.

THE installation photograph above shows an unusual application of chuting equipment to a large concrete garage which was built in a crowded business district, and under unusually crowded conditions. The main tower supported a unit counterweight plant in addition to two overhead cables which ran out at an angle of 120 degrees with each other to anchorages on adjacent buildings. These overhead cables supported elbow sections of chute. The unit counterweight plant poured directly all the concrete within 150-ft. of the base of the tower and was elevated on the tower so that the counterweight section could be swung around and connected to either line of the elbow connected chutes which covered the balance of the building.

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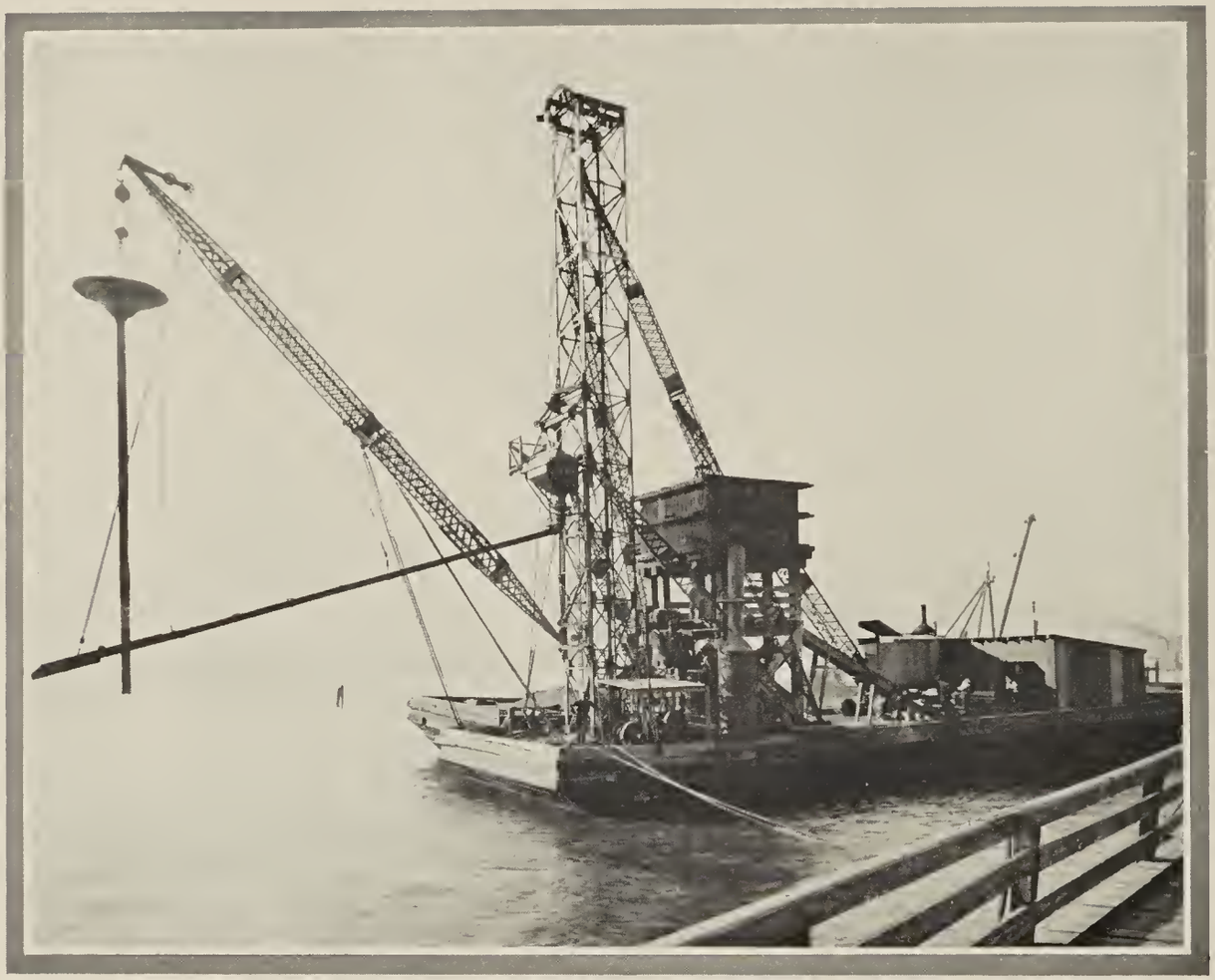
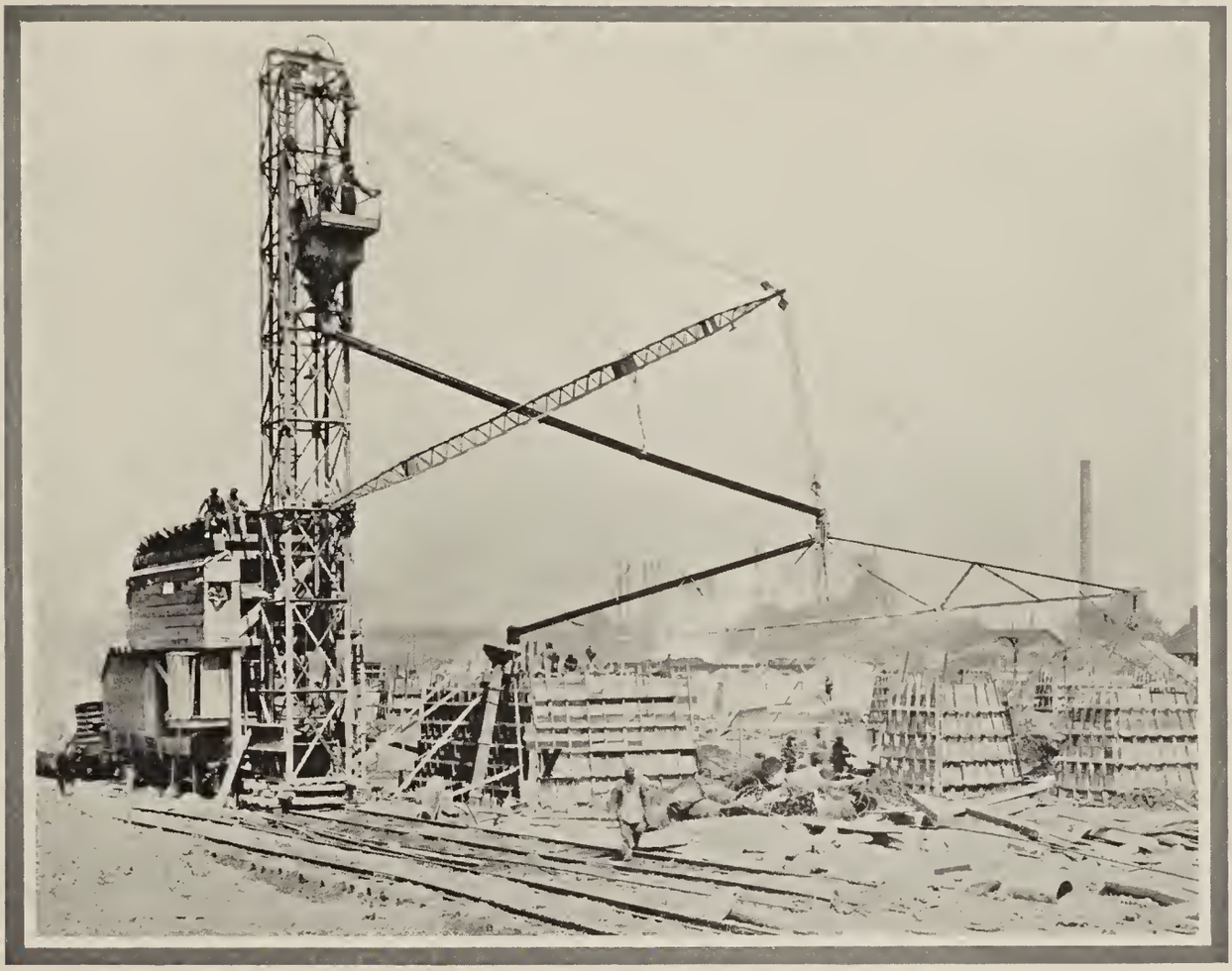


The Sanford-Brookes Company, Baltimore, Md.

THERE are many occasions where the floating plant is the only solution of the concreting problem, either placing concrete under water or in the super structure. The plant shown above was designed to handle at the first of the work, a tremie chute and, later on, the concrete in the super structure of the bridge itself. The 70-ft. steel tower was anchored in place on the barge by stiff legs as can be clearly seen. The boom supporting the chute was mounted on a special sliding frame which can be placed at different elevations on the tower as required. The movement of the tremie chute was all controlled from the foot of the tower. The boom can swing the tremie chute thru practically 180 degrees and will be used later to support a counterweight chute section. Lakewood engineers have had wide and varied experience with the design and operation of special plants such as this one and that experience is at the service of contractors without obligation on their part.



The Otis Steel Company, Cleveland, Ohio

THE plant shown above is one of three furnished for a steel plant job. Each contained a one yard mixer, 60-ft. tower and 100-ft. boom counterweight chute plant. In order to keep the over-all height of the bins as low as possible the tower was suspended in front of the car by means of two heavy I beams which extended the length of the car and were bolted into the car frame. This made it possible to drop the elevator bucket below the car floor which made it unnecessary to elevate the mixer. When in position for pouring, the tower was blocked up from the rails. The plant was moved from point to point by the locomotive crane which loaded the bin over the mixer. When moving, no guys were required but when the plant was in position for pouring, four guys from the top of the tower were used. The chuting plant poured concrete 130-ft. to either side of the car. Many times, on car plants, the towers are hinged either at the bottom or at panel points so they can be lowered to pass under bridges, etc.

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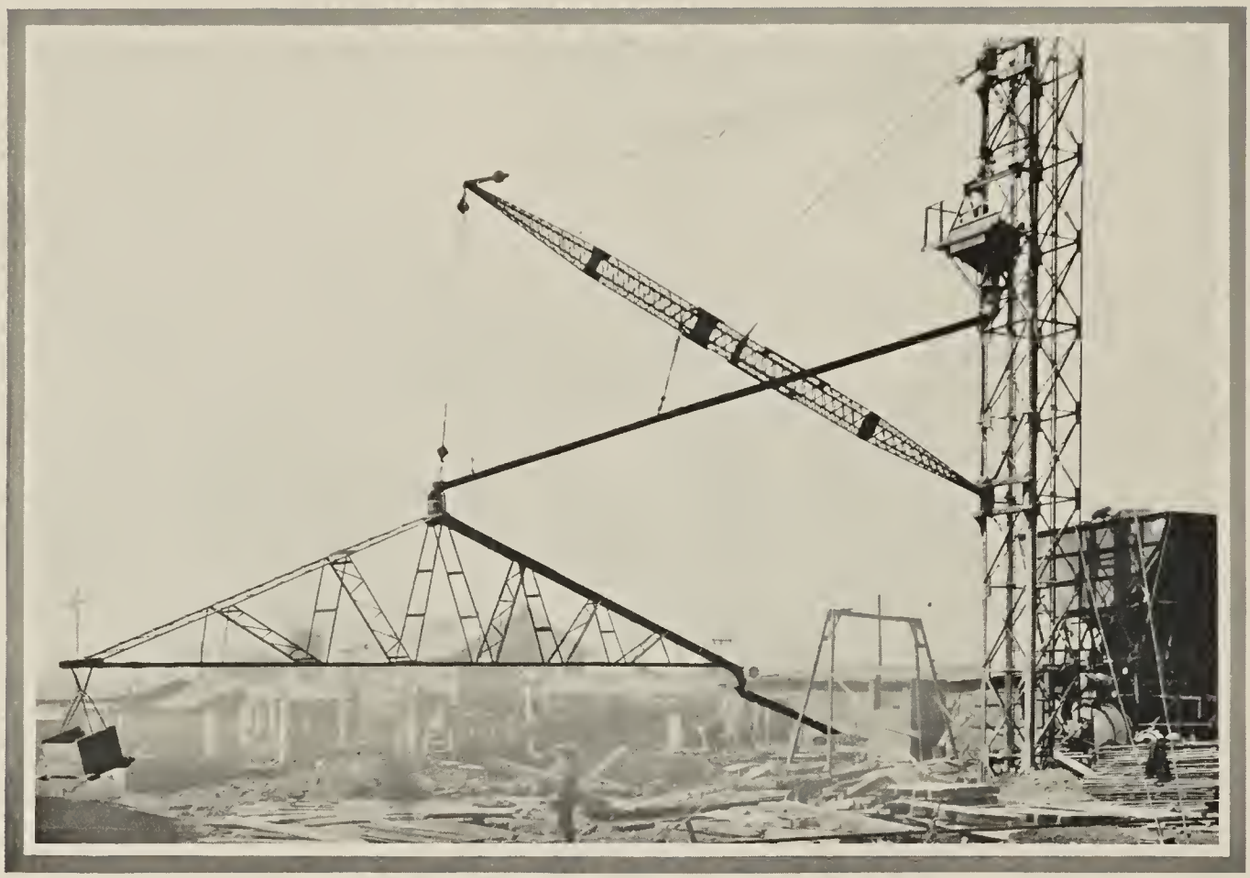


The Gulf Refining Company, Philadelphia, Pa.

The Boom Counterweight Plant

A complete Lakewood concrete mixing and placing plant—including a one yard mixer, 150-ft. steel tower and 130-ft. boom counterweight plant with which the counterweight chute may be tied down while pouring concrete, eliminating all supports.

The Boom Counterweight Plant

THE boom counterweight plant is the most commonly used type of chuting plant. Designed for use on either steel or wood towers, it provides a flexible and economical plant for placing concrete within a 175-ft. radius of the supporting tower.

A plant of this type is diagramed completely on pages 24 and 25. Vertical flexibility for the plant is obtained by mounting the boom and tower hopper on a steel frame, which slides on guides attached to the outer sides of the front corner posts of the tower. This frame is shifted by means of a cable running over sheaves on top of the tower to the hoisting engine, and permits moving the plant on the tower as a unit.

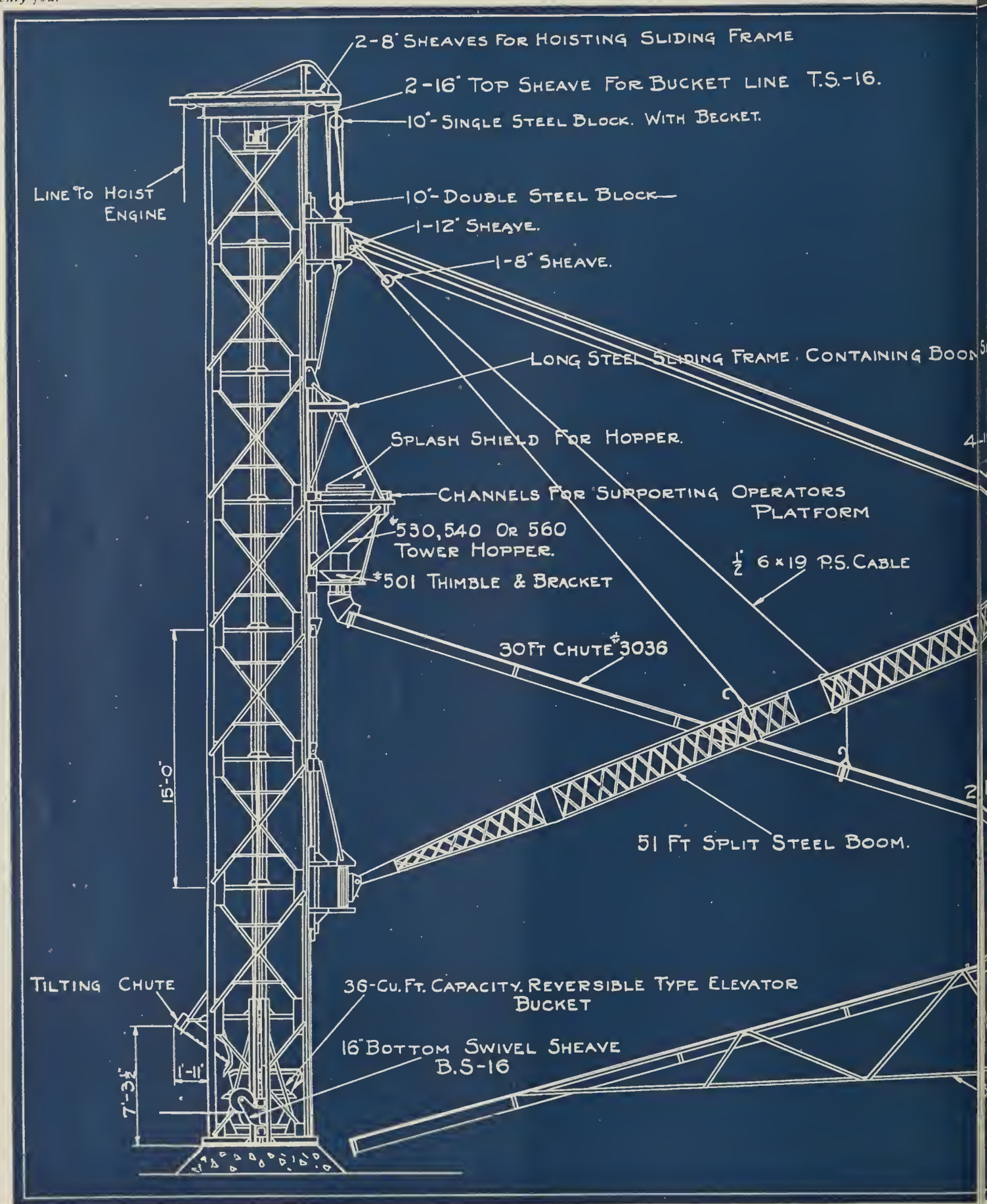
The use of a counterweight chute as the second section of the plant greatly reduces the time and labor required for moving the chutes from point to point when pouring. Counterweight chutes are simply standard chute sections with a truss so arranged that a weight hung at the end of the truss balances the chute. As Lakewood counterweight chute sections are made in 20-ft., 30-ft., and 50-ft. lengths, a great number of plant combinations are possible. Additional sections can be attached to the counterweight section to cover a greater area if the job requires it.

Using a boom counterweight with a light type counterweight, the discharge end of the counterweight must always be supported when pouring concrete. However, if desired, the heavy type counterweight sections may be used and the counterweight tied down when pouring concrete. Furthermore, the plant may be extended by additional 30-ft. length, in other words, to 130-ft. radius, and the counterweight may be tied down during concreting, thus eliminating all supports for the plant except the discharge end of the 30-ft. chute section. Many times this is a valuable feature on the job. However, with this type of plant, the heavy counterweight must not be tied down with more than a 30-ft. chute attached, when pouring concrete.

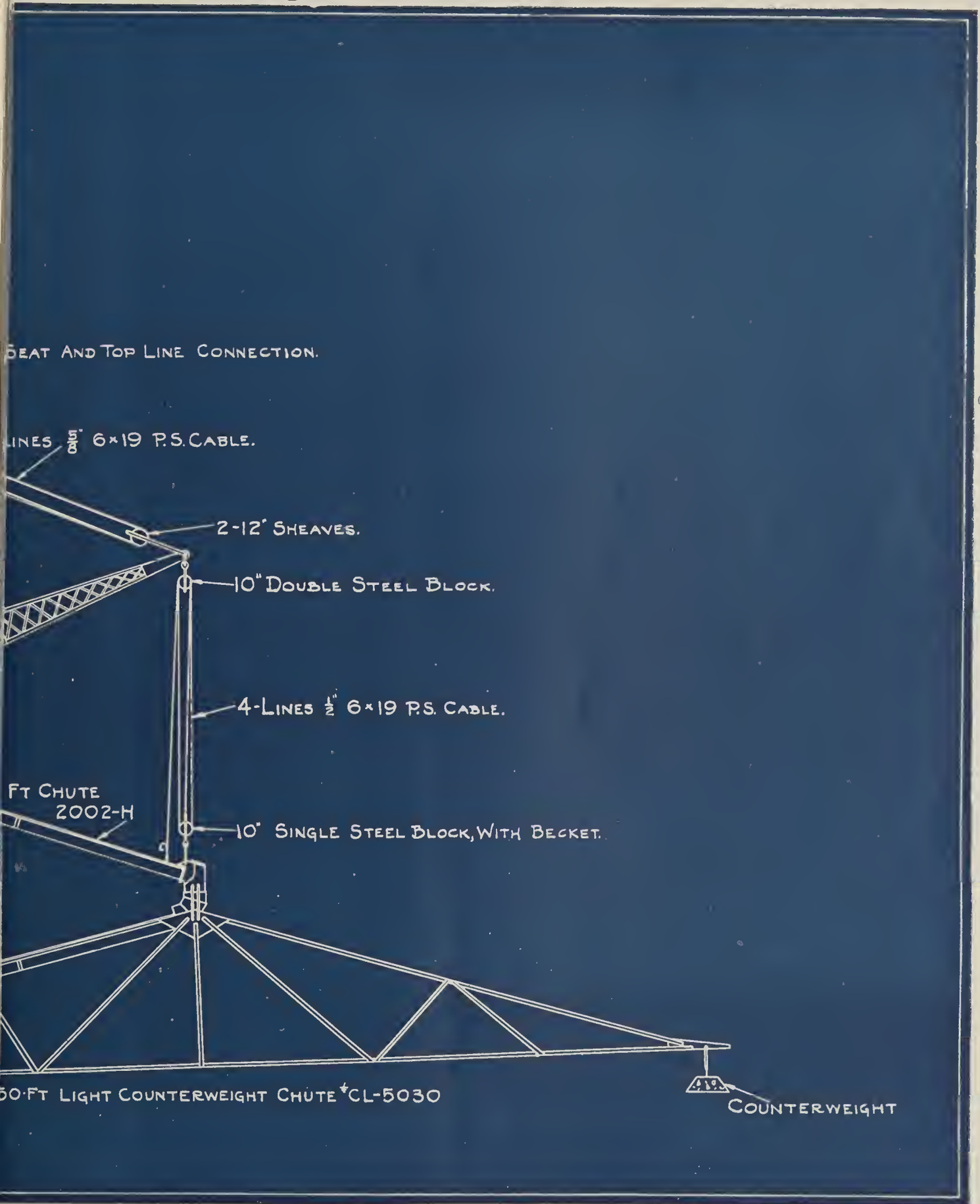
Altho the boom counterweight plant is used principally on stationary towers alone or in combination with continuous line chute, it has been found to be a very valuable unit for use with portable plants, mounted on cars, special travelers, or barges; the car plant is, of course, most valuable on bridge work, grade separation, retaining wall and steel mill foundation work.

Every detail of the Lakewood boom counterweight plant has been carefully worked out—it is furnished complete in all respects, with the exception of steel blocks and cable and is a plant which will produce the results expected of it.

The Lakewood Boom



Counterweight Plant



The Lakewood Steel Tower

The fundamental idea in the design of the new type Lakewood steel tower was to cut down the number of different parts required for the tower, thus making erection easier and quicker and, at the same time, develop greater strength than ever heretofore secured for standard equipment.

This has been accomplished with the result that the new Lakewood steel tower offers greater strength, fewer different parts, greater flexibility, greater possibilities as to plant layout and easier and quicker erection than any tower on the market. This statement can be quickly proved by a comparison of the following detail specifications covering the Lakewood steel tower.

THE TOWER MAKE UP: The standard tower is made up of a top and bottom section with as many intermediate sections as desired for height. Each intermediate section is 15-ft. high and is divided into two panels of 7½′ each. The top and bottom sections are not figured as adding height to the tower. **All intermediate sections are interchangeable in parts and position.**

MAXIMUM HEIGHT: The standard Tower can be built to a height of 240-ft. with a 130-ft. boom counterweight plant, tied down when pouring concrete.

BOLTS: All the bolts required for the tower are furnished; ¾″ bolts are used thruout.

BOTTOM SECTION: The bottom section consists of four heavy angles to which are riveted ½″ plates to provide perfect bearing for the tower without increasing the number of shipping units. Anchor bolt holes are provided for in the gusset plates and angles of the bottom section. Any intermediate section can be attached to this bottom section.

BOTTOM SHEAVE: A 16″ bottom swivel sheave of heavy construction is furnished for the base of the tower. **The support for this sheave is so designed that the sheave can be put at the very bottom of the tower or at the first panel point, 7½′ up, as conditions demand.** This takes care of the bottom sheave in case the base of the tower is put below ground level. The bottom sheave support can be placed on either side of the tower desired.

GIRTS: The girts are angles. **Every girt on the tower is alike.** Each girt has a three-bolt connection at each end.

DIAGONALS: Diagonals are angles. **Every diagonal member on the tower is alike and interchangeable,** and as with the girts, each has a three-bolt connection.

NOSE BOARD: A 15-ft. section of nose board for the elevator bucket is furnished with each intermediate section. Angle clips are provided on the nose board for attaching it to the girt angle. **All nose boards are interchangeable.**

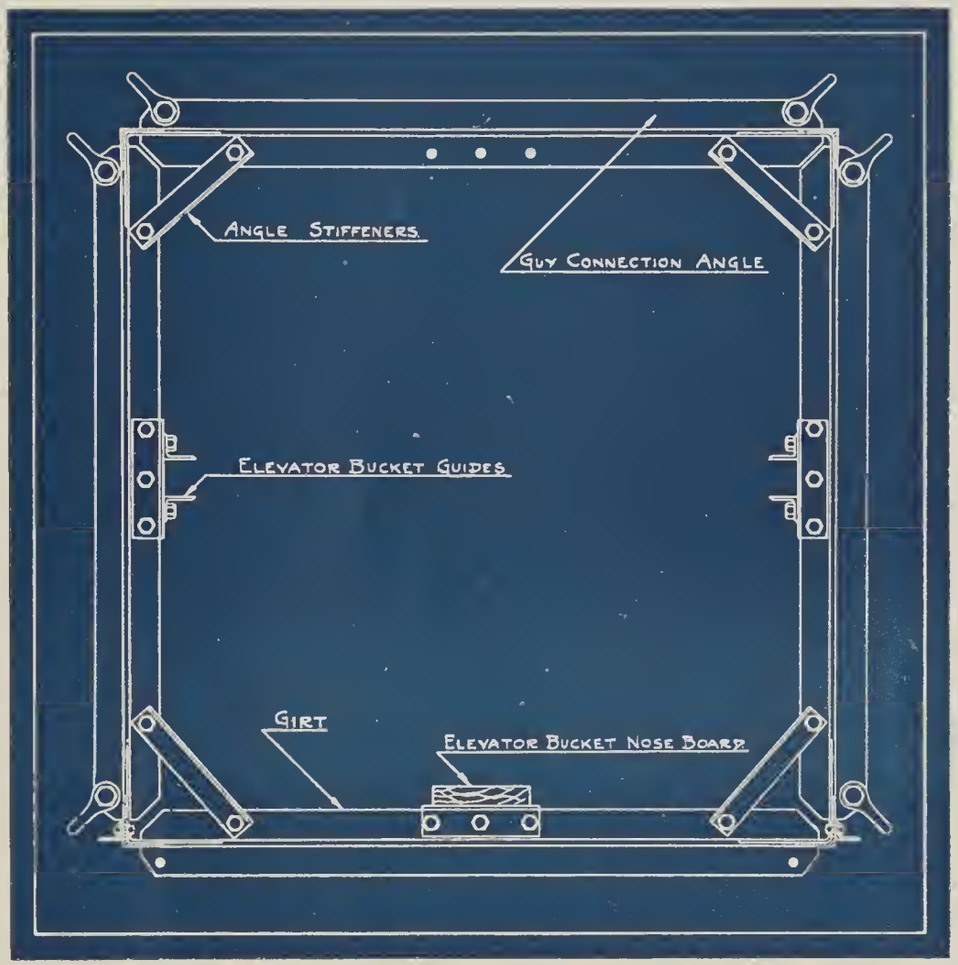
ELEVATOR BUCKET: The elevator bucket has 36 cu. ft. water level capacity, **so designed that it can be reversed in its frame and dump out of either the front or rear of the tower.** The bail contains a sheave for double hoisting line. Weight complete 1675 pounds.

LADDER: **A pipe ladder is provided which can be bolted to any one of the four sides of the tower.**

The Lakewood Steel Tower

FRONT CORNER POSTS: The front corner posts are composed of two angles riveted together back to back, the outside angle acting as the sliding frame guide. **The front corner posts of the tower are the same from top to bottom.**

REAR CORNER POSTS: **The rear corner posts are composed of one heavy angle and are the same from the top to the bottom of the tower. The tower is so designed that where the plant requires it, double angle legs such as are used for the front corner posts, can be used in the rear, greatly increasing the strength of the tower, without making a single change in any of the other parts. This change which can be made in the field where conditions require it makes it possible to put a sliding frame plant on both front and rear of the tower; a layout advantage which is sometimes very valuable, especially when considered in connection with the reversible elevator bucket which is designed for use in this tower.**



ELEVATOR BUCKET GUIDES: The elevator bucket guides consist of two angles, 15 ft. long, gusseted together with angle clips for connection to the girts. **They are interchangeable from top to bottom of the tower and on either side of the tower.**

GUY CONNECTIONS: The intermediate guy connections consist of a set of girt angles, which bolt to and on the outside of the standard girt angles at any panel point. **These guy connection angles contain shackles for the guy lines and can be placed at any panel point of the tower to meet job conditions.** The top section guy connections consist of heavy ½" plates across the corners of the top channels of the tower and also include shackles.

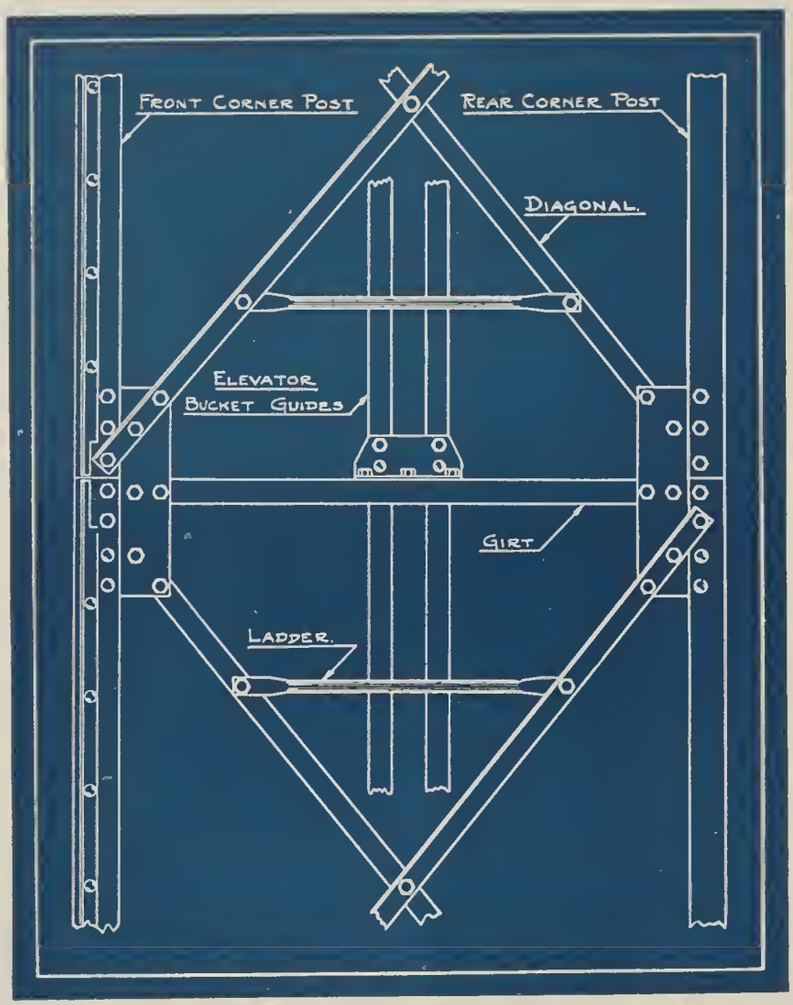
The Lakewood Steel Tower

TOP SHEAVES: For the hoisting line, two 16″ bronze bushed sheaves are included. **The sheave support is so arranged that these sheaves may be attached to either side of the tower desired.**

Shift line sheaves for the sliding frame hoisting line are also provided as standard equipment.

CABLE SEAT: The top section is so designed that a seat for the overhead cable on continuous line plants is a part of the section and comes as standard equipment.

This seat fits into the standard section; requires no special holes and can be installed on any tower in the field.



BOOM COUNTER-WEIGHT PLANT: (See Pages 8, 9)

The type of plant which is used more often than any other on general building work is the boom counterweight plant. In the past, steel towers have been designed to take the boom counterweight plant with the provision that the counterweight section must be supported when pouring concrete. **The unusual strength and rigidity of the Lakewood steel tower makes it possible to use the boom counterweight plant on it, including a heavy type counterweight which can be tied down during concreting operations supporting an additional 30′ chute.**

This is the big feature in connection with the boom counterweight plant, because it eliminates the support for the counterweight which in many cases is very awkward and troublesome to handle.

The Lakewood Steel Tower

SLIDING FRAME:

As previously stated, the sliding frame uses as guides, the outside angles of the front legs of the tower. A short steel sliding frame is provided for continuous and unit plant installations, while a long steel sliding frame, including both boom seat and top line connection, is provided for the boom plant. **These frames are so designed that the continuous line sliding frame becomes the intermediate section of the long steel sliding frame,** a particularly valuable feature, as it cuts down the number of units required to make up a flexible chuting plant for the contractor.

Sliding frames are provided with a channel base for the hopper operator's platform. These channels can be attached to either side of the frame desired.

The sliding frame, when in position at a panel point, is fastened to the tower by means of bolts running thru slotted holes in the side members of the frame and the outside angle of the front legs of the tower.

No dumping triggers, aprons or baffle plates are required for the sliding frame. A splash shield, running around the sides of the hopper, is furnished as standard equipment. **All sliding frames include the steel blocks which are required for their operation.** Any size of type "O" Lakewood tower hopper can be used with the standard steel sliding frames.

SIDE PANELS SHIPPED ASSEMBLED:

If desired, the side panels of the tower can be shipped completely riveted up, leaving as loose pieces, only the front and rear diagonals and girts, which means still faster erection. Towers will not be shipped this way unless specified.

Tower Height	Bottom Section	Intermediate Section	Top Section	Intermediate Guy Connections	Code	Weight
30-ft.	1	2	1	1 set	Tache	7,867
45-ft.	1	3	1	1 set	Tavern	10,300
60-ft.	1	4	1	2 sets	Tango	12,923
75-ft.	1	5	1	2 sets	Tame	15,356
90-ft.	1	6	1	2 sets	Tazazo	17,789
105-ft.	1	7	1	3 sets	Teacher	20,412
120-ft.	1	8	1	3 sets	Teasel	22,845
135-ft.	1	9	1	3 sets	Telescope	25,278
150-ft.	1	10	1	4 sets	Temple	27,901
165-ft.	1	11	1	4 sets	Tendon	30,334
180-ft.	1	12	1	4 sets	Tena	32,767
195-ft.	1	13	1	5 sets	Terrapin	35,390
210-ft.	1	14	1	5 sets	Tarpon	37,823
225-ft.	1	15	1	5 sets	Tacci	40,256
240-ft.	1	16	1	6 sets	Tapl	42,879

Each bottom section includes a 16" swivel sheave and tilting chute.

Each intermediate section includes a 15-ft. length of nose board.

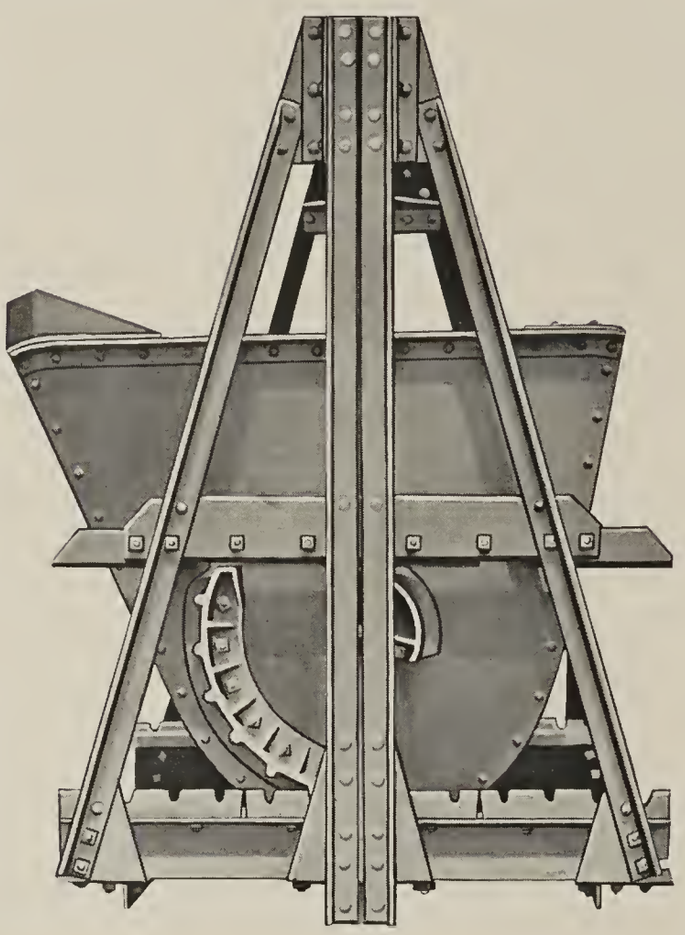
Each top section includes two 16" top sheaves and two shift line sheaves for the sliding frame line.

All guy connections include shackles for the cable.

The Lakewood Engineering Company
Cleveland, U. S. A.

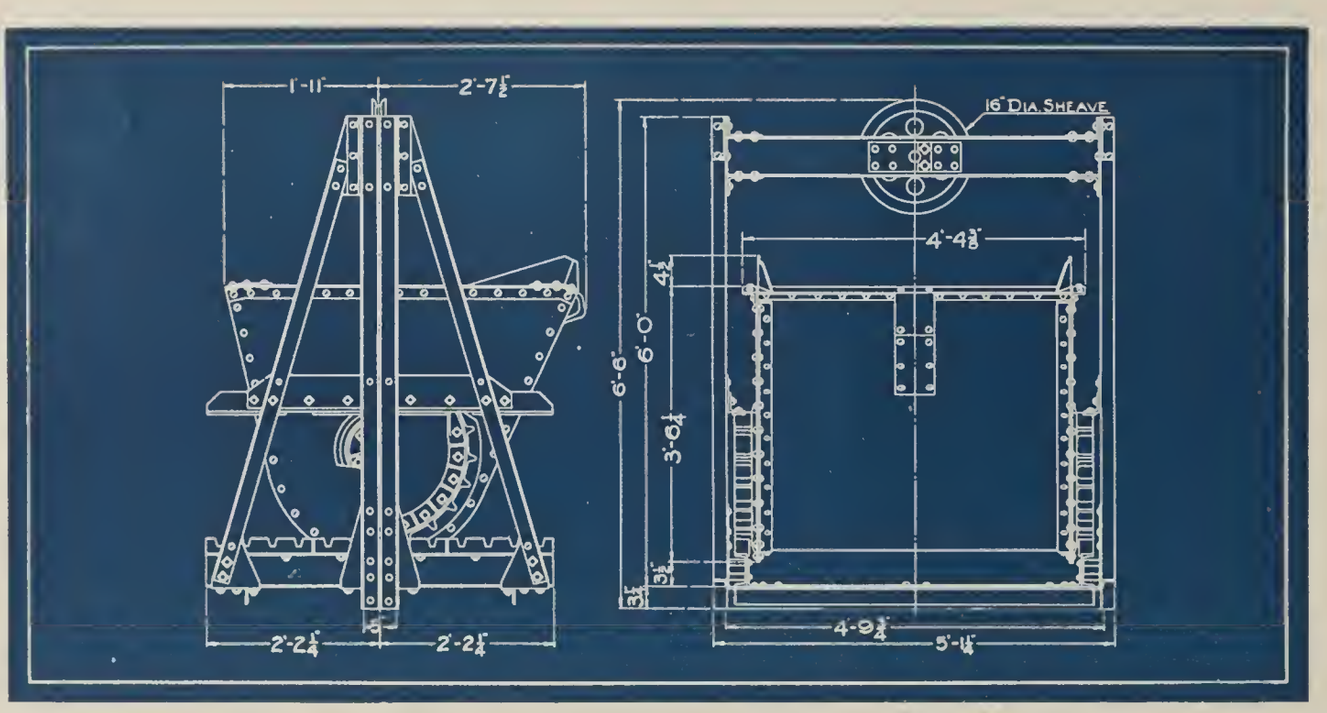
Type "O" Elevator Bucket No. 828-S For No. 732 Steel Tower

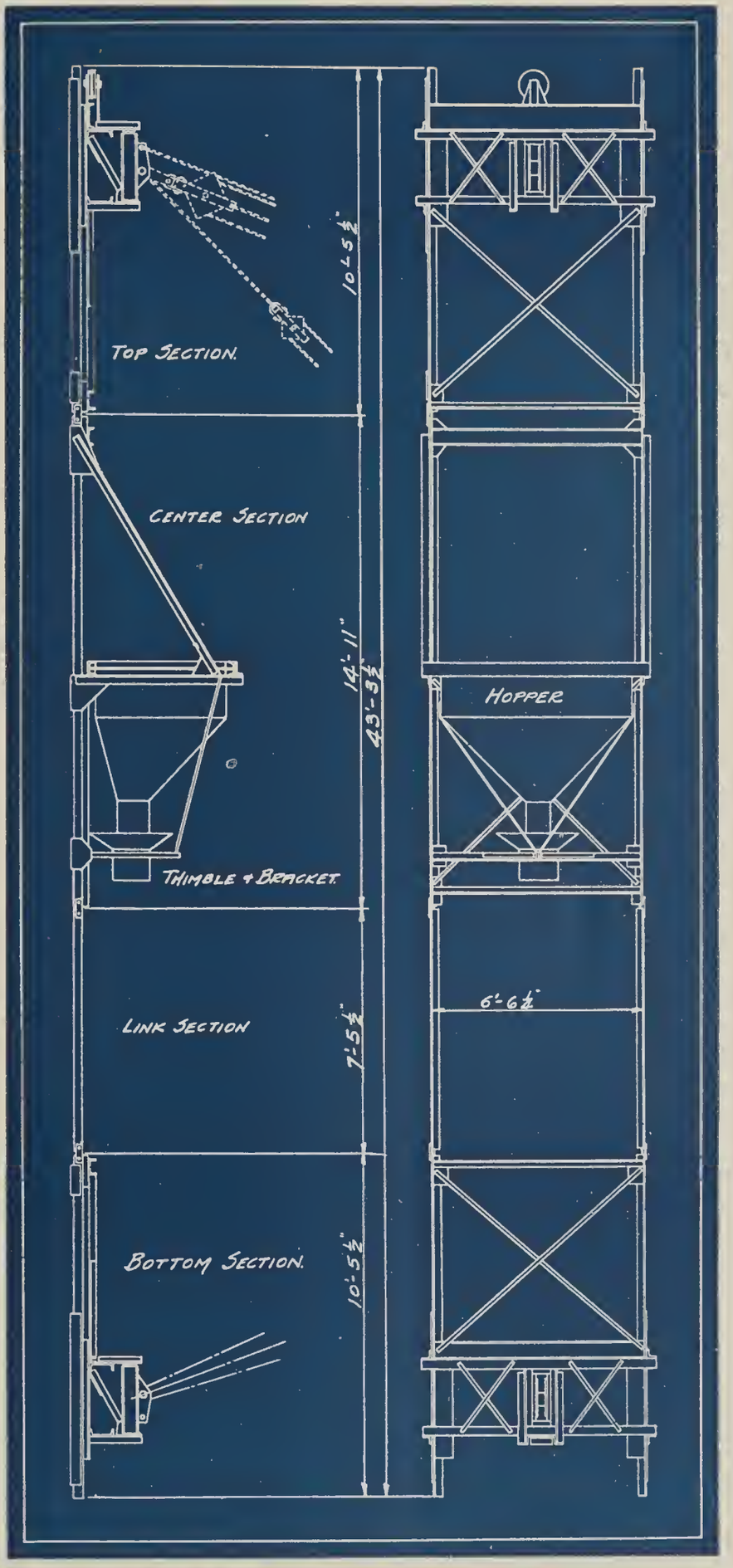
One of the most unusual and valuable features of the Lakewood steel tower is the elevator bucket. This bucket is so designed that it is reversible and can be dumped thru either the front or the rear of the tower. The bucket is of the nose board type, which eliminates all triggers, latches, springs and rollers. The result is a quick dumping, smooth working bucket of the simplest design possible and one which requires a minimum of attention under strenuous working conditions.



The bucket body rides on two rocker castings, bolted to its sides. These rocker castings, in turn, run on a cast track which bolts to the bottom of the bucket frame. The bucket is positively locked into the frame by means of an angle bolted into the upper part of the frame across the top of the rocker casting. This angle is slotted on the bottom so that when the bucket dumps forward, the end of the rocker casting will catch in the slot, stopping the bucket's travel. When returning from the dumping position, the opposite end of the rocker casting catches into this same notch, thus limiting the bucket's backward travel.

By unbolting the locking angles on each side, the bucket body can be picked up, turned around and headed to dump out of the opposite face of the tower. This change can be made in an hour, a feature which, when considered with the possibility of mounting a sliding frame plant on both the front and rear of the Lakewood steel tower, opens up a new layout possibility never before secured with standard equipment. The bucket weighs 1675 pounds and has a water level capacity of 36 cubic feet.





Long and Short Steel Sliding Frames for the No. 732 Steel Tower

SLIDING frames for steel towers are constructed to run on angle guides riveted to the front corner posts of the tower. The frame is moved up and down the tower by means of a cable which runs over sheaves on top of the tower to the hoisting engine. No blocks are required for the sliding frame as sheaves are mounted in the top section of the tower and in the top part of the sliding frame to eliminate their use.

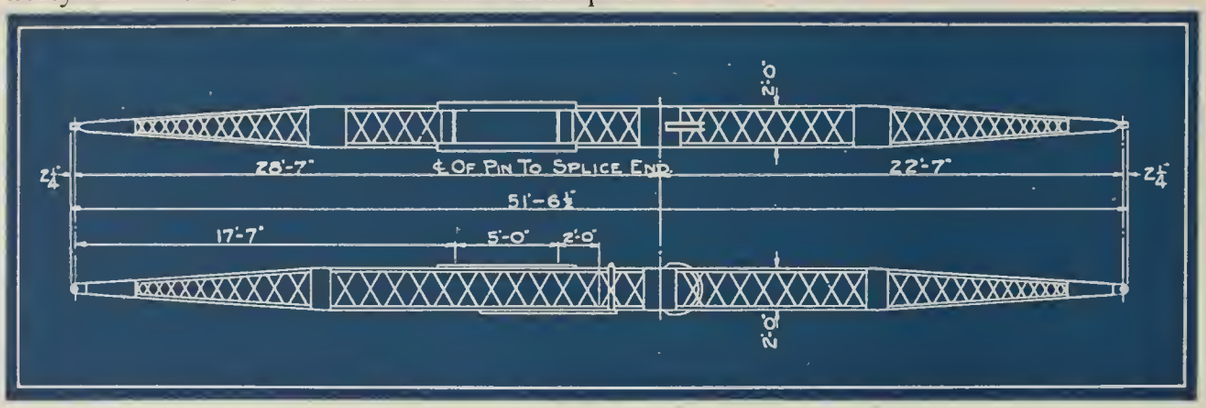
When the sliding frame is in proper position on the tower for pouring concrete, it is fastened to the tower by means of bolts running thru slotted holes in the sliding frame members and the guide angles on the tower. The hoppers on the frame set flush with the tower and are equipped with splash shields. No dumping triggers, aprons or latches are required for the elevator bucket. All steel sliding frames are equipped with channels which can be attached to either side of the frame to form a base for an operator's platform.

The long steel sliding frame is used for the boom counterweight plants, but the center or hopper section of this long sliding frame forms the short steel sliding frame which is used with continuous line or straight unit chute plants. This center section is complete in itself. No steel sliding frame for steel towers require blocks.

The Lakewood Engineering Company
Cleveland, U. S. A.

Lakewood No. 503 Open Steel Boom

THE open steel boom for the 100-ft. boom counterweight plant is furnished with shackles but no blocks and an opening is provided at the proper point for the chute to pass thru as shown in the cut below. This boom is for either the steel or wood tower plant and is to be used with either the heavy or light type counterweight section. Its weight complete as shown is 1960 pounds. This boom has a capacity of 12 tons when in a horizontal position.



Blocks Required for Various Types of Plants

Plants	Tower	8" Single Steel	10" Single Steel	10" Double Steel	12" Single Steel	12" Double Steel
Boom Counterweight	Steel	1–½" cable	1–½" cable	1–½" cable	1–⅝" cable	1–⅝" cable
	Wood	.....	1–½" cable	1–½" cable 2–⅝" cable		2–⅝" cable
Unit Plant	Steel	.....	1–⅝" cable	1–⅝" cable	.....	.....
	Wood	.....	2–⅝" cable	.....	.....	.....
Unit Counterweight	Steel	.....	1–⅝" cable	1–⅝" cable	.....	.....
	Wood	.....	1–⅝" cable	1–⅝" cable	.....	.....
Continuous Line	Steel	No Blocks	.....	.....	.....	.....
	Wood	.....	2–⅝" cable	.....	.....	.....

All blocks to be with shackle and becket.
All blocks should be diamond steel shell.
Hook blocks should not be used on chuting plants.

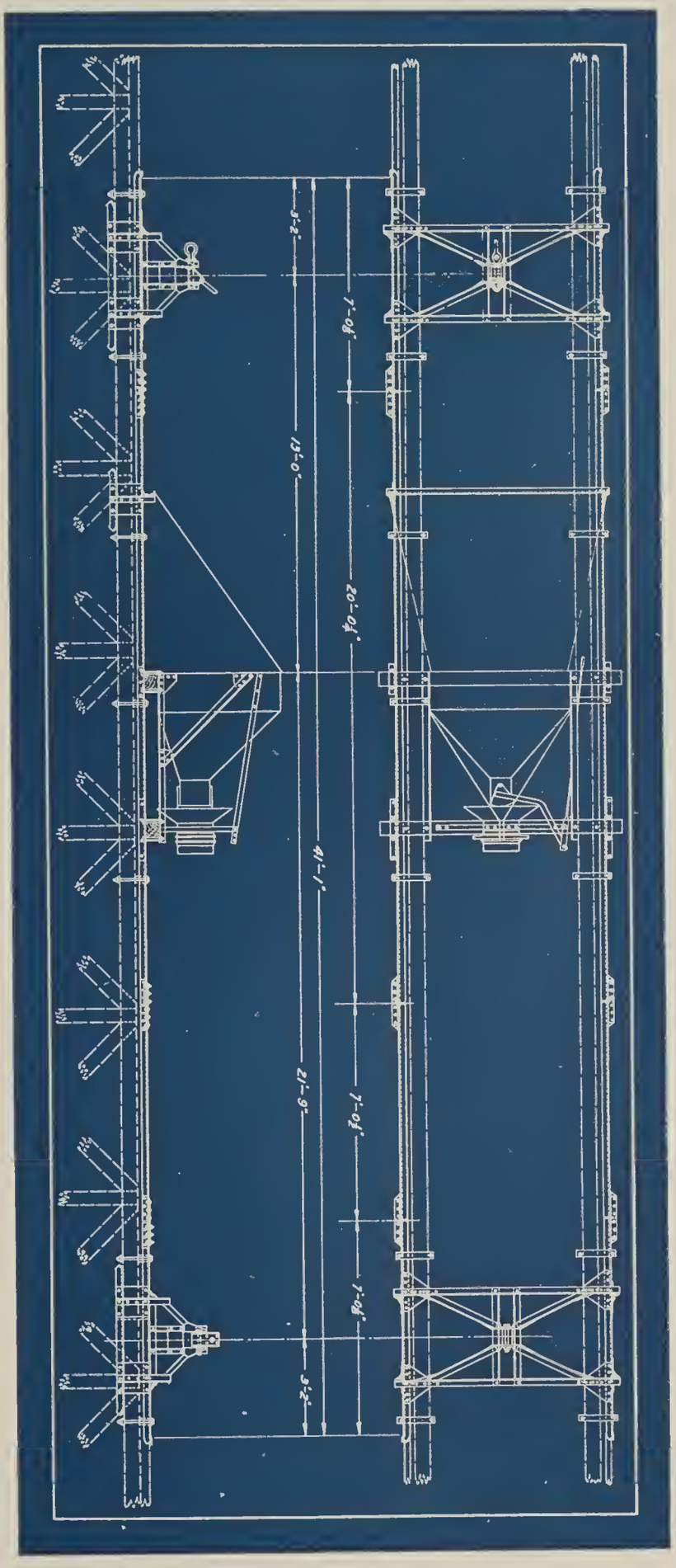
Cable Requirements for Steel Tower Sliding Frames and Buckets

Height of Tower	Elevator Bucket Hoist		Sliding Frame	
	Single Line	Double Line	Short Steel Sliding Frame	Long Steel Sliding Frame
60 ft.	130 ft.	185 ft.	190 ft.	165 ft.
75 ft.	160 ft.	230 ft.	250 ft.	240 ft.
90 ft.	190 ft.	275 ft.	310 ft.	315 ft.
105 ft.	220 ft.	320 ft.	370 ft.	390 ft.
120 ft.	250 ft.	365 ft.	430 ft.	465 ft.
135 ft.	280 ft.	410 ft.	490 ft.	540 ft.
150 ft.	310 ft.	455 ft.	550 ft.	615 ft.
165 ft.	340 ft.	500 ft.	610 ft.	690 ft.
180 ft.	370 ft.	545 ft.		765 ft.
195 ft.	400 ft.	590 ft.	730 ft.	840 ft.
210 ft.	430 ft.	635 ft.	790 ft.	915 ft.
225 ft.	460 ft.	680 ft.	850 ft.	990 ft.
240 ft.	490 ft.	725 ft.	910 ft.	1065 ft.

Cable from bottom of tower to hoist must be added to above lengths.

CABLE FOR BOOM COUNTERWEIGHT PLANT:

From top of sliding frame to end of boom—210 ft.
From top of sliding frame to 30 ft. point in boom chute—90 ft.
From end of boom to counterweight—90 ft.
All the above cable should be ⅝" 6x19 plow steel.



Long Steel Sliding Frame for Wood Towers

THE Long Steel Sliding Frame for a wood tower is held in place on the tower by steel shoes running on a 2 x 10 timber, bolted to the sides of the front corner posts of the tower. This guide timber must, of course, project far enough out from the corner posts to allow the frame to clear all bolt heads on the face of the tower. When in position for pouring the frame is held firmly in place on the tower by fourteen clamps or is lashed to the tower. Any size of Type "O" Hopper can be used with this frame, and the horizontal members of the frame are adjustable to the widths of towers required for the ½, ¾, or 1-yard Type "O" elevator buckets.

The frame is shipped in three sections and can be easily erected or dismantled in the field.

The steel blocks required for rigging the steel sliding frames are 10″ double. One should be fastened to the cat head of the tower and the other to the ring in the top of the sliding frame. The fall line runs over sheaves on the top of the tower to the hoisting engine. One-half inch Plow Steel cable should be used for this purpose.

On long steel sliding frames for either wood or steel towers the boom seat and peaking line connection are provided. They are designed for the Lakewood Steel Boom No. 503 as shown on page 32. The first section of chute of a boom plant passes through a 5′ 2″ opening provided in the steel boom for that purpose.

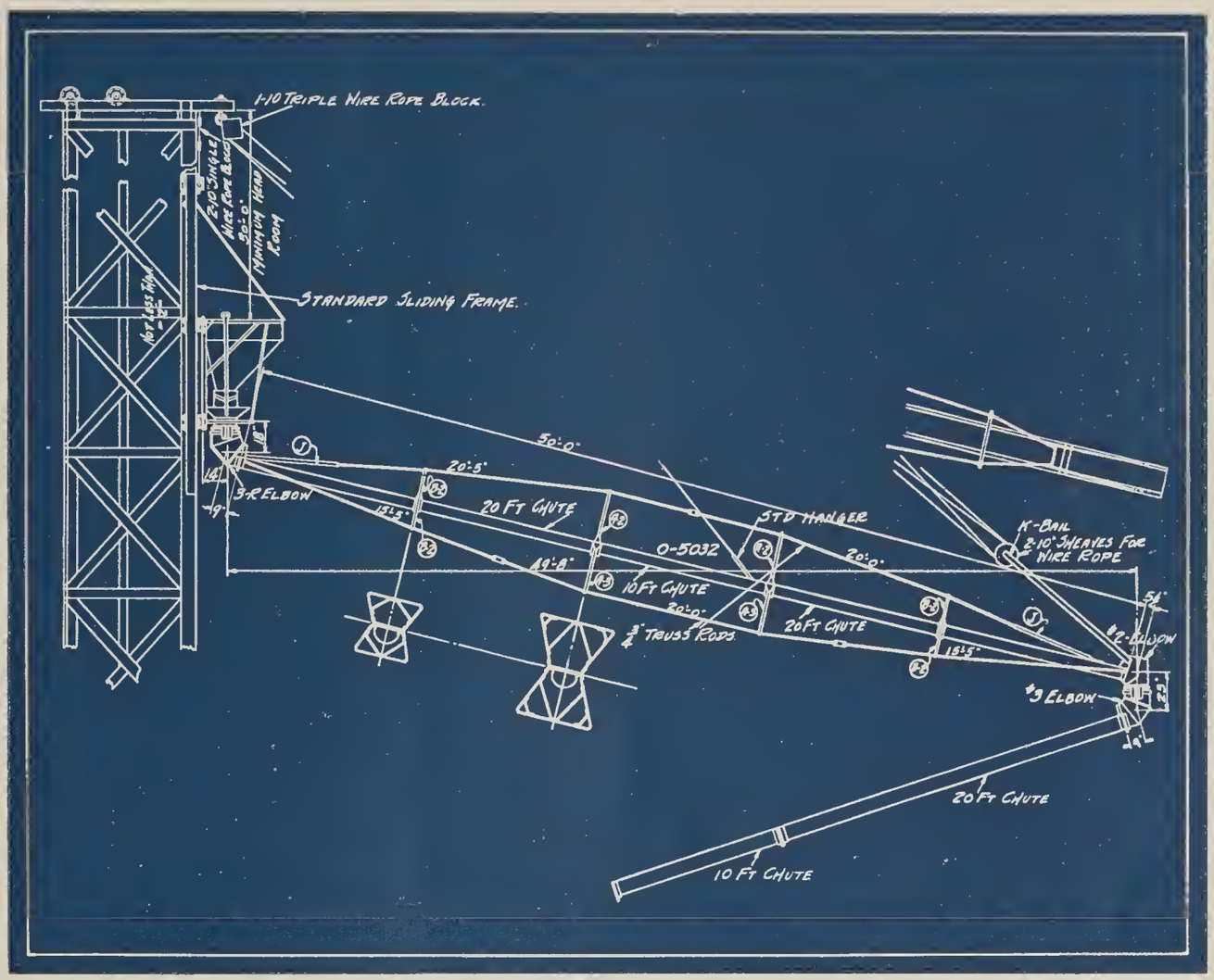
Lakewood Unit Counterweight Plant

THE essential differences between the Unit Counterweight plant and the Boom Counterweight plant lie in the first section of chute and the sliding frames. In the unit plant the first section of chute is made heavier and trussed in such fashion that no separate boom is required. A head line of cable is run from the bail at the end of the boom to the cathead of the tower, eliminating the steel boom entirely.

The sliding frame for the unit counterweight plant on a wood tower is of wood, strongly trussed, while when the plant is used on a steel tower the sliding frame is of steel. Of course, as there is no separate boom, a relatively short sliding frame is required for unit counterweight plants. Which means the plant can be moved more easily up and down the tower. The boom section, or first section, of chute is made in 20, 30, 40 and 50 foot lengths. The length used, of course, depends on the type and size of counterweight selected. The plants are furnished complete with the exception of cable and blocks for the sliding frame.

Easy to erect and somewhat lighter in weight than the boom counterweight plant, the unit counterweight plant provides a flexible economical and speedy method for placing concrete. When used with 50 foot counterweights on a wood tower, we recommend the standard Lakewood tower design, using 8″ x 8″ corner posts. When used with the smaller counterweight section, a wood tower with 6″ x 6″ corner posts will meet all conditions. The tower of course should be bolted.

Lakewood Unit Plant



THE Lakewood unit plant, designed for use on either wood or steel towers, consists of a tower hopper mounted on a sliding frame, one section of trussed chute, which acts as a boom, and one additional section of chute. This type of plant can be easily and quickly moved up and down the tower, and makes a very compact, easily operated plant for the smaller jobs. The unit plant is furnished in 40, 60, 80 and 100-foot sizes.

Many combinations can be worked out, as any size of hopper from 20 to 60 cubic feet working capacity, and any radius of operation can be secured with these plants, depending, of course, on the size of mixer used and the area to be covered with the chutes. Assume for example an area 160 x 90-ft. where it is possible to set up at the center of the long side. An 80-ft. unit plant made up of a 50-ft. boom section and a

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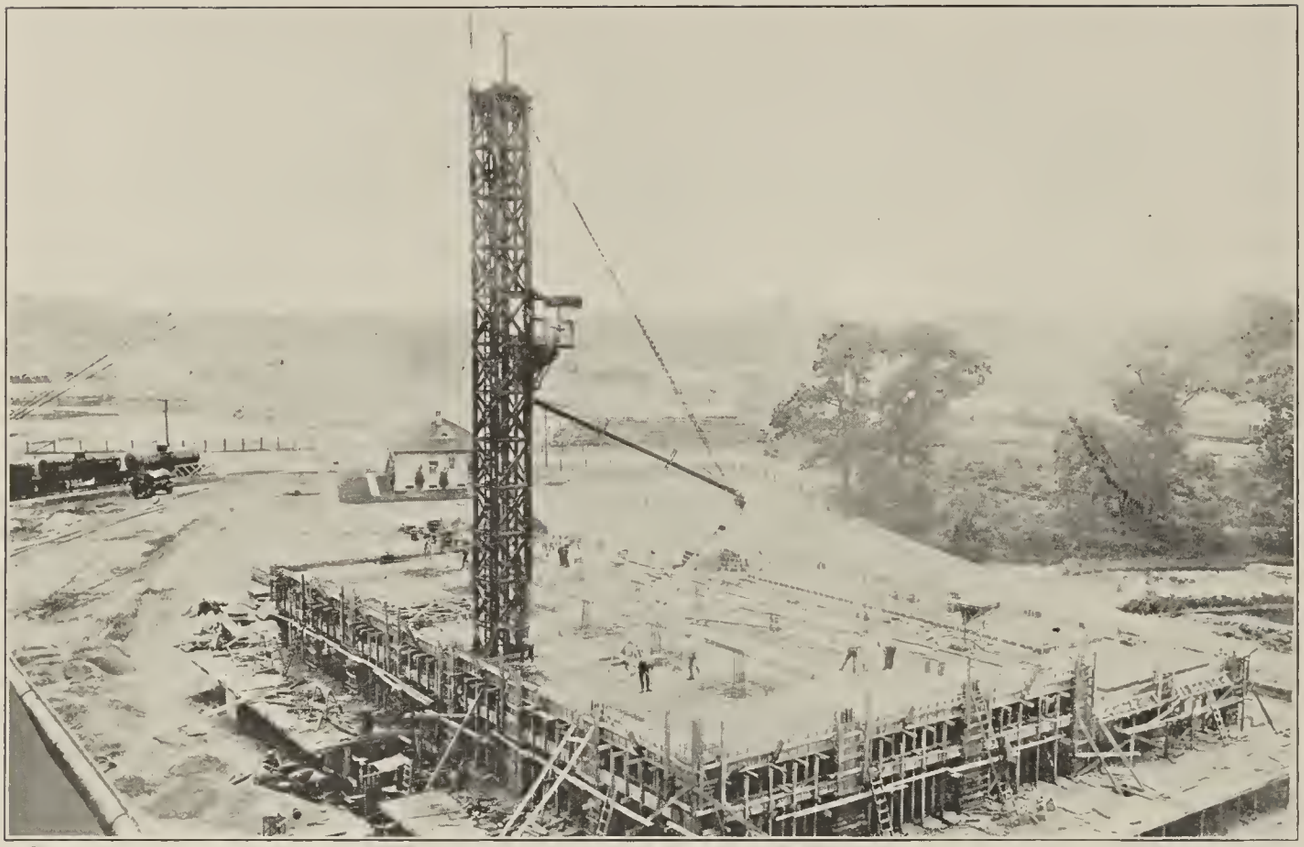
Lakewood Unit Plant, 60 Ft. Radius



30-ft. plain end section would be just the outfit for the work—no supports would be required except at the end of the 30-ft. section and the plant could be easily handled from point to point when pouring.

It is generally advisable to make up a 100-ft. plant, using a 50-ft. boom section and an additional 30-ft. and 20-ft. elbow section, supported at the 30-ft. point rather than using two 50-ft. sections because the first plant can be handled so much more easily than a trussed 50-ft. section and it will cover the area with fewer moves of the entire plant. Furthermore, the 20-ft. and 30-ft. light counterweight can be attached to the end of the unit plant boom section without making any changes whatever in the boom section itself. In a word, these smaller plants have all the advantages of the larger Lakewood plants but being lighter and lower in first cost, they apply particularly well to the smaller jobs. They can be easily and quickly assembled in the field from standard erection drawings. When using the unit plants on a wood tower, we strongly recommend the standard Lakewood wood tower design as shown in this bulletin.

Component Parts 60 Ft. and 80 Ft. Unit Plants

Plant Number	Code Word	Receiving Hopper		First Section Boom Chute		Second Section Standard Chute		Total Weight
		Number	Working Capacity	Number	Length	Number	Length	
O-2321	Cinder	521	20 cu. ft.	O-3032	30 ft.	3030	30 ft.	3111 lbs.
O-2331	Camp	531	30 cu. ft.	O-3032	30 ft.	3030	30 ft.	3171 lbs.
O-2341	Canter	541	40 cu. ft.	O-3032	30 ft.	3030	30 ft.	3258 lbs.
O-2361	Calm	561	60 cu. ft.	O-3032	30 ft.	3030	30 ft.	3641 lbs.
O-2421	Candy	521	20 cu. ft.	O-4032	40 ft.	40308	40 ft.	3866 lbs.
O-2431	Canister	531	30 cu. ft.	O-4032	40 ft.	40308	40 ft.	3926 lbs.
O-2441	Cannibal	541	40 cu. ft.	O-4032	40 ft.	40308	40 ft.	4013 lbs.
O-2461	Calumet	561	60 cu. ft.	O-4032	40 ft.	40308	40 ft.	4396 lbs.

Wood Towers

WHETHER using wood or steel towers, the rule for determining the maximum height of the tower required is as follows:

Take the maximum height at which concrete is to be poured above the tower base and add to this one-third of the distance through which the concrete is to be chuted, which takes care of the necessary fall in the chute line and to that sum add 20 to 30 feet for the necessary tower headroom. The addition for headroom, of course, depends entirely upon the type of plant used.

In building a wood tower, carefully constructed templates should be made exactly in accordance with the tower drawings. These templates should contain the exact location of all bolt holes. If possible, each timber should be marked with a number. In other words, the corner posts should all bear one number, the cross braces another, and so on. This will shorten materially the time consumed in erecting the tower. One of the most important things, of course, in erecting any tower is guying. When the tower has reached a height of 35 or 40 feet the first set of guys should be attached. Turn-buckles with shackles should be placed at the anchor ends of the guy line. These turn-buckles make it possible to take up slack in the guys when plumbing the tower, and the shackles make it possible to slip a guy for the purpose of allowing the boom to swing or for clearing obstructions. The upper end of the guy is attached by taking a couple of turns about the corner post and clamping the cable.

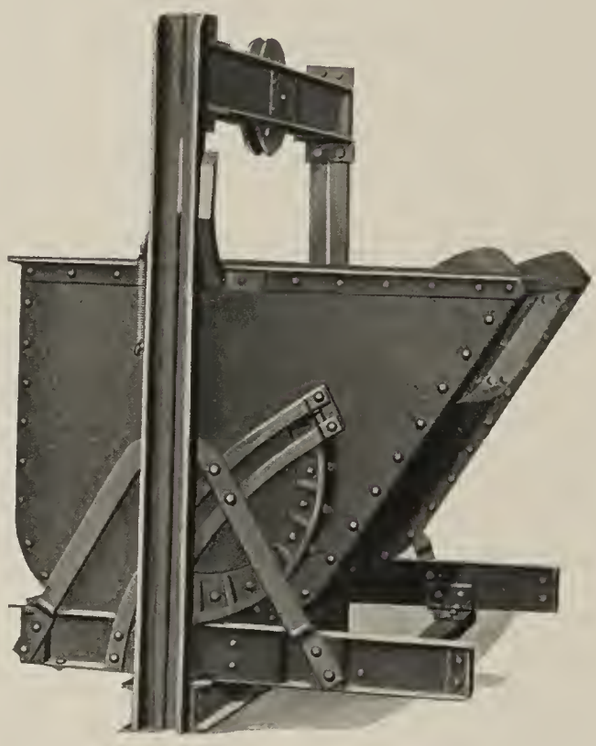
Guy Lines and Clips Required for Towers

Guying Point Above Ground	Total Lgth. Wire Rope For 1 Set (4 Guys) 45° Angle	Tower Heights and Lengths of Guy Sets in Feet —20′ Added to Each Line for Anchorage—																
Feet	Feet	40	50	60	70	80	90	100	110	120	130	140	150	160	180	200	220	250
30	247	...	247	...	...	...	247	....	....	....	....	....	....	....	....	....	....	....
40	308	308	...	308	308	308	....	308	308	308	308	308	308	308	308	308	308	308
50	364	...	364	...	...	...	....	....	....	....	....	....	....	....	....	....	....	....
60	420	...	...	420	...	...	420	....	....	....	....	....	....	....	....	....	....	....
70	476	...	...	...	476	...	....	....	....	....	....	....	....	....	....	....	....	....
80	532	...	...	...	...	532	....	532	532	532	532	532	532	532	532	532	532	532
90	588	...	...	...	...	...	588	....	....	....	....	....	....	....	....	....	....	....
100	648	...	...	...	...	...	....	648	....	....	....	....	....	....	....	....	....	....
110	702	...	...	...	...	...	....	....	702	....	702	....	....	....	....	....	....	....
120	760	...	...	...	...	...	....	....	....	760	....	760	760	760	760	760	760	760
130	816	...	...	...	...	...	....	....	....	....	816	....	....	....	....	....	....	....
140	875	...	...	...	...	...	....	....	....	....	....	875	....	....	....	....	....	....
150	928	...	...	...	...	...	....	....	....	....	....	....	928	....	....	....	....	....
160	984	...	...	...	...	...	....	....	....	....	....	....	....	984	984	984	984	984
170	1044	...	...	...	...	...	....	....	....	....	....	....	....	....	....	....	....	....
180	1097	...	...	...	...	...	....	....	....	....	....	....	....	....	1097	....	....	....
190	1152	...	...	...	...	...	....	....	....	....	....	....	....	....	....	....	1152	1152
200	1208	...	...	...	...	...	....	....	....	....	....	....	....	....	....	1208	....	....
220	1324	...	...	...	...	...	....	....	....	....	....	....	....	....	....	....	1324	1324
250	1496	...	...	...	...	...	....	....	....	....	....	....	....	....	....	....	....	1492
Total Length of Guy Rope Required		308	611	728	784	840	1255	1488	1542	1600	2358	2475	2528	2584	3681	3792	5060	6556
No. Sets of Guys Required		1	2	2	2	2	3	3	3	3	4	4	4	4	5	5	6	7
Clips Required—6 Clips per Guy...		24	48	48	48	48	72	72	72	72	96	96	96	96	120	120	144	168

The Lakewood Engineering Company
Cleveland, U. S. A.

Type "L" Elevator Buckets for Wood Towers or No. 731 Steel Tower

THE Type "L" Elevator Bucket is a heavy, sturdy bucket of the latch and trigger type, built especially for the No. 731 steel tower but also can be used with a wood tower. The bucket is balanced to dump forward, but is held in the vertical or hoisting position by a spring latch on the side of the bucket. On dumping, the bucket first strikes a sliding iron on the tower hopper apron, which forces the bucket backward, relieving the load on the latch at the time it is released by a block on the tower guide, allowing the bucket to dump into the hopper. When the bucket is in the dumping position it has a discharge angle of 45 degrees. This type of bucket can be made to dump at any point by changing the position of the block on the tower guide and the dumping angle. The No. 651-S is the 14 cu. ft. bucket for the steel tower.

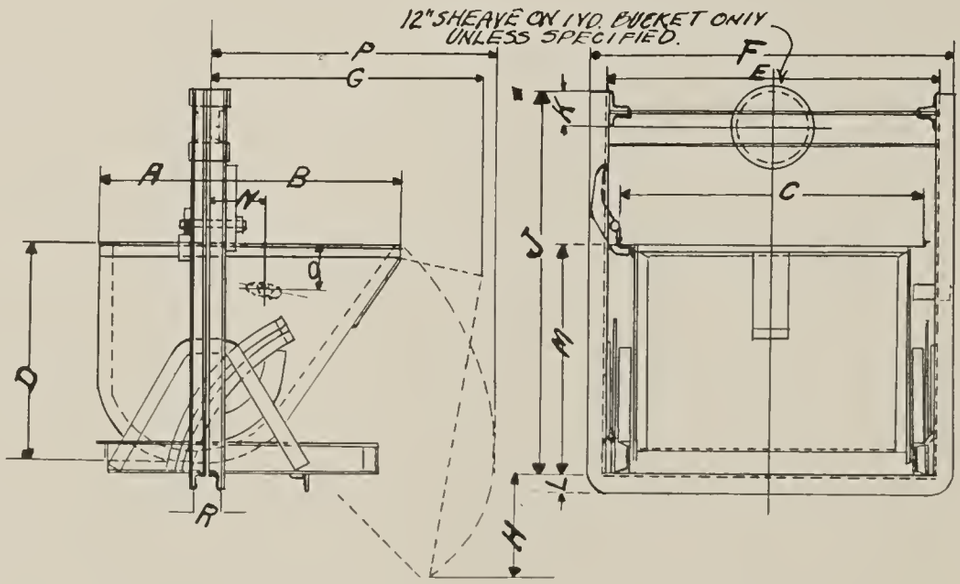


No.	Code Word	Capacity Working	Cu. Ft. Water Level	Wt. Lbs.	A	B	C	D	E	F	G	H	J	L	N	O	P	R
651	Wobe	14	17	762	15 11/16	27 7/16	36 3/8	31 7/16	41 1/2	47	36 3/4	15 1/4	57 1/2	3	8 1/2	6	40 1/2	3 3/4
651	Woe	28	31	1375	18 1/2	32 1/4	50 1/2	36 3/4	55 1/2	60 1/2	45	17	63 3/4	3	9 1/8	7 3/4	47 1/4	4 5/8
651-S	Tick	14	17	850	18 1/2	32 1/4	50 1/2	21 13/16	55 1/2	60 1/2	....	....	56 1/4	3	9 1/8	7 3/4	....	4 5/8

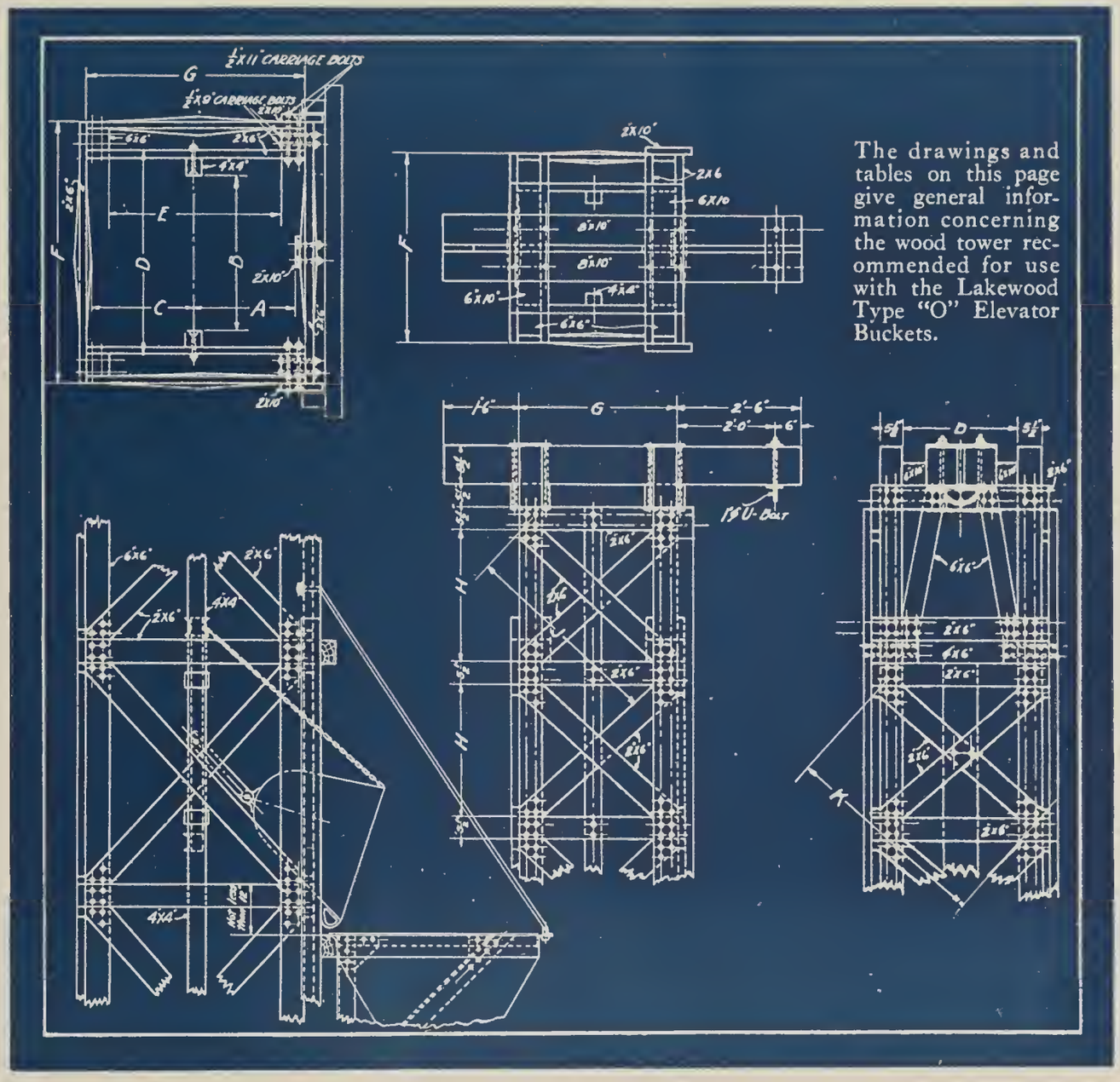
No. 651 Lakewood

Elevator Bucket

Dimensions



Wood Tower for Type "O" Elevator Buckets



The drawings and tables on this page give general information concerning the wood tower recommended for use with the Lakewood Type "O" Elevator Buckets.

Dimensions of Wood Tower For Use with Type "O" Elevator Buckets

Elevator Buckets Working Capacity		Tower Dimensions, Inches									
No.	Cu. Ft.	A	B	C	D	E	F	G	H	J	K
808	8	25	40	24	50½	40¾	64¾	51¾	54	74¾	81¾
814	14	30	46	27	56½	48¼	70¾	59¼	60	84¾	90¼
822	22	33½	50	30	60½	54¾	74¾	65¾	66	93	97¼
828	28	33½	52	30	62½	54¾	76¾	65¾	66	93	98¾
835	35	38½	52	32	62½	61¾	76¾	72¾	72	102½	102¾
860	60	45½	59¼	36	69⅝	72¾	84	83¾	..	.....	.....

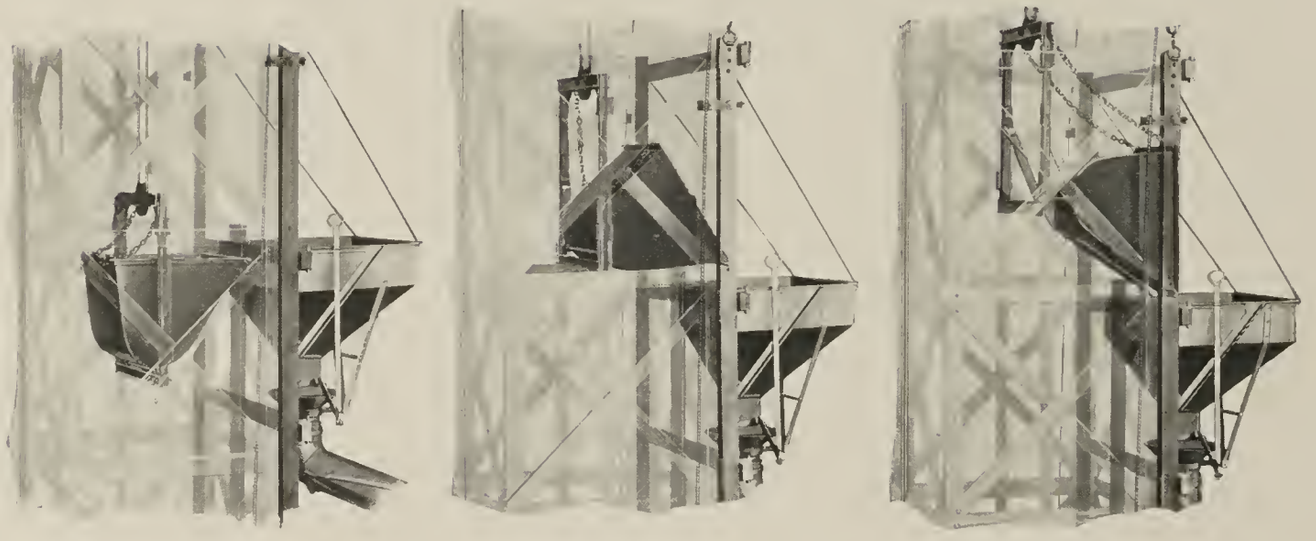
NOTE: Dimensions given in above table are for dressed timber. Make allowance if rough timber is used.
A, B and C must not be varied.
For complete wood tower details, ask for Blue Print No. A-1.

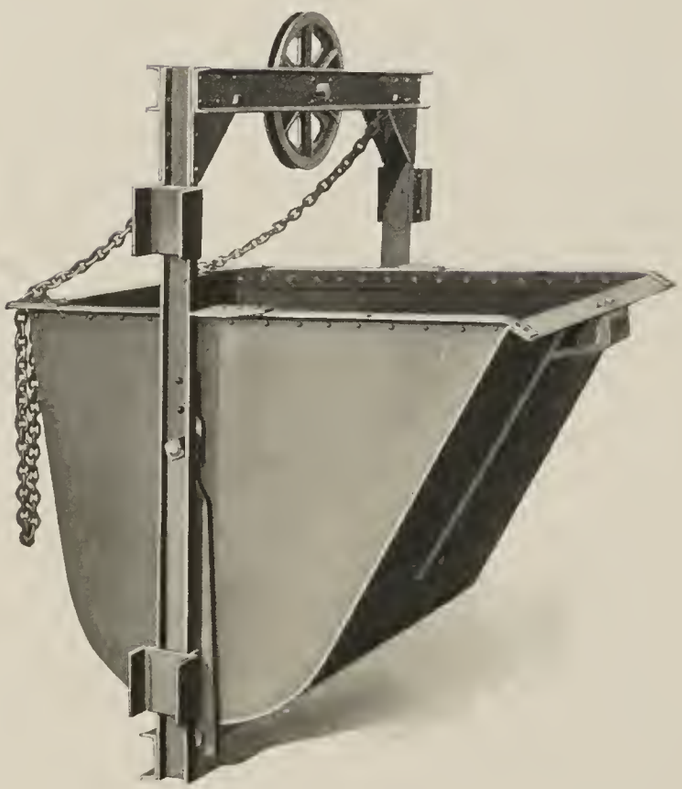
The drawings and tables on this page give general information concerning the wood tower recommended for use with the Lakewood Type "O" Elevator Buckets.

The Lakewood Engineering Company
Cleveland, U. S. A.

Lakewood Type "O" Elevator Buckets

For Use With Wood Towers

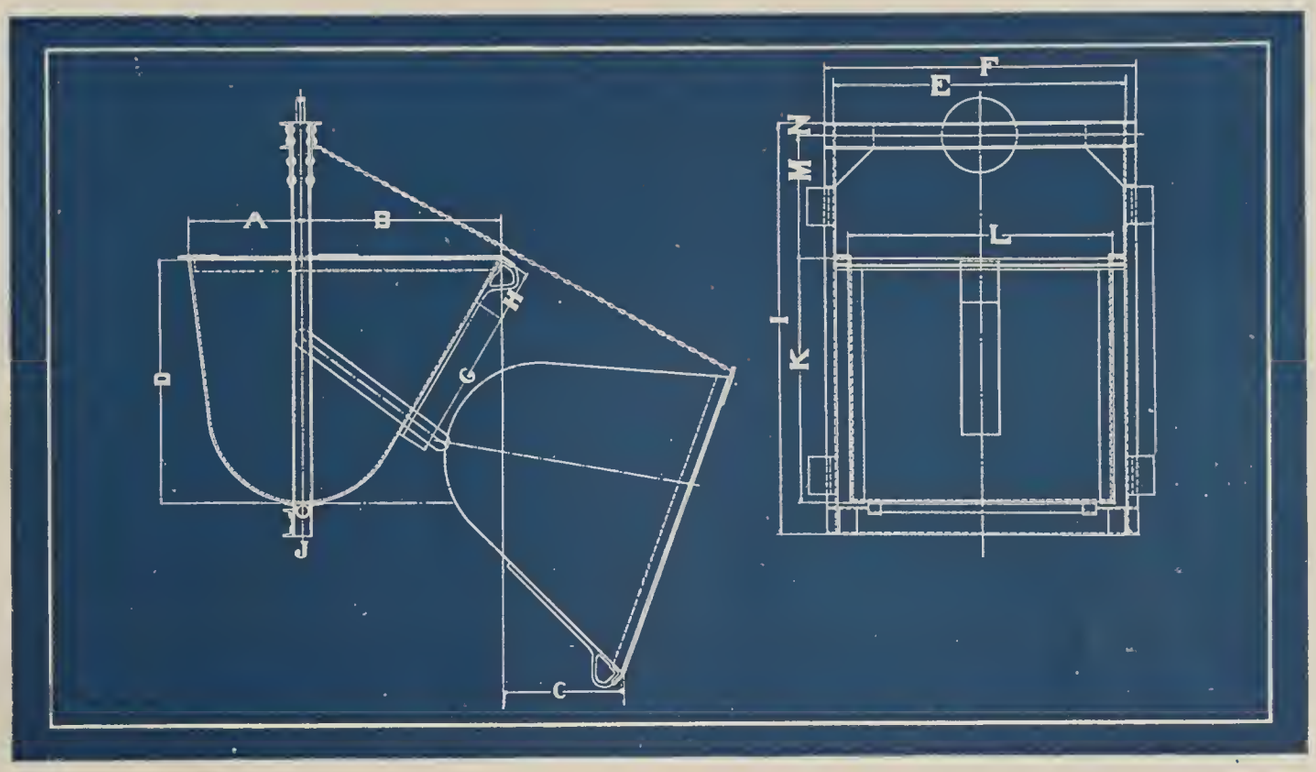




THE Type "O" Elevator Buckets are for use with wood towers only. They are simple in operation, have few working parts and are as light as is consistent with good design. The capacities, both working and water level, are given for the various sizes on the opposite page. The bucket is balanced to dump forward and is held in the vertical or hoisting position by sliding against a nose board in the face of the tower. A heavy casting is placed on the nose of the bucket for this purpose. The Type "O" Bucket can be made to dump at any point by removing a section of the nose board. In dumping, this bucket pivots about two points and the arm supporting the first pivot point allows the bucket to reach through the face of the tower and over the tower receiving hopper, attaining a 45 degree discharge angle.

Lakewood Type "O" Elevator Buckets

For Use With Wood Towers



Type "O" Elevator Bucket Capacities and Dimensions

No.	Code Word	Capacity Working	Cu. Ft. Water Level	Wt. Lbs.	A	B	C	D	E	F	G	H	I	J	K	L	M	N
808	Wade	8	11	400	12	22	14	28	35¾	38 5/16	15	6	49½	3	28	30½	16	2
814	Wake	14	20	510	14⅞	26⅞	16	34	41¾	44 5/16	18	8	58	3	34	36½	18	2
822	Wale	22	28	650	17⅛	30⅜	18	38	45¾	48 5/16	24	8	64½	3	38	40½	20	2
828	Wane	28	30	670	17⅛	30⅜	18	38	47¾	50 5/16	24	8	64½	3	38	42½	20	2
835	Wed	35	40	840	19¾	35	21	44	47¾	50 5/16	30	8	72½	3	44	42⅝	22	2
860	Wedding	60	66	1710	24	42	18	53½	54	57⅛	36	8	79¼	4	53½	48	17⅝	3
800	Win	..	..	50	Tilting Chute for feeding Type "O" Elevator Buckets.													

Cable Sizes and Horse Power Required For Operating Type "O" Elevator Buckets

Elevator Buckets		Hoisting Speeds Single Line				Size of Hoisting Lines			
						C. C. S. Wire Rope		Plow Steel Wire Rope	
						6 Strands, 19 Wires		6 Strands, 19 Wires	
No.	Total Weight Bucket & Load	100 Ft. per Min.	150 Ft. per Min.	200 Ft. per Min.	300 Ft. per Min.	Single Line	Double Line	Single Line	Double Line
		Horse Power Required, Steam							
808	1600	7	10	13	20	⅜	¼	⅜	¼
814	2610	11	16	21	32	½	⅜	½	⅜
822	3950	16	24	32	48	⅝	½	½	⅜
828	4900	20	30	40	60	⅝	½	⅝	½
835	6100	25	38	50	75	¾	½	⅝	½
860	10700	43	65	86	130	1	¾	⅞	⅝

Horse power required is estimated on the basis of 25,000 pounds lifted one foot in one minute, instead of the theoretical basis of 33,000 pounds lifted one foot in one minute.

The figures tabulated are practical and safe and apply when steam power is used. When electric power is used add about 25%, and gasoline power 50% to the horse power required.

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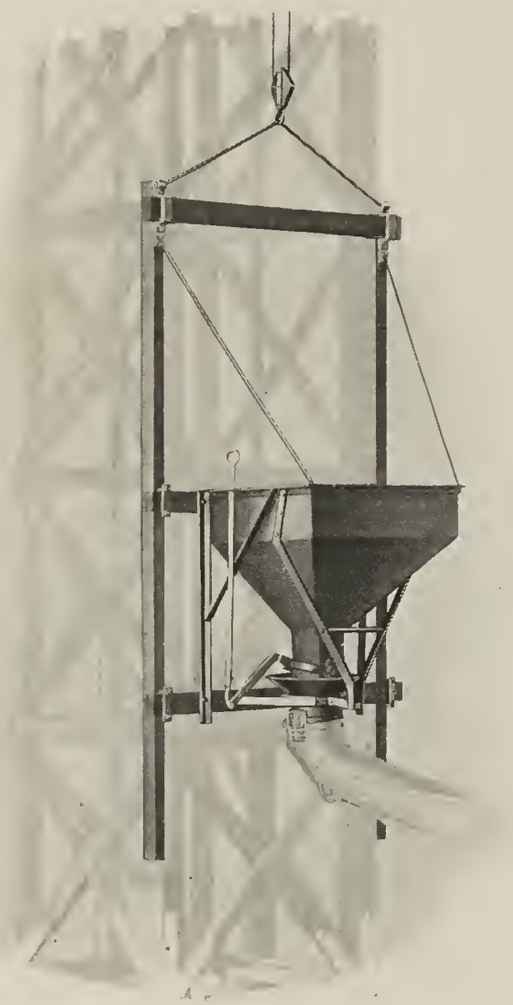
Type "O" Tower Hoppers and Wood Sliding Frames

For Use With All Type "O" Plants On Wood Towers Except Counterweight Plants



THE Type "O" Tower Hopper can be attached to the tower direct or mounted on a sliding frame separate from the tower. In wood tower construction a 2x10 must be attached on each side of the front corner posts of the tower, extending out far enough in front of the tower to allow the sliding frame to clear the bolts on the cross braces. This provides a smooth track for the sliding frame. With the hopper mounted on a sliding frame, the unit can, of course, be shifted to any desired elevation on the tower with the minimum amount of time and labor. There is a certain relationship between the size of the mixer, size of elevator bucket and size of hopper, which, in general, may be stated as follows: The working capacity of the elevator bucket should correspond with the wet batch capacity of the mixer. The tower hopper should be about 50 per cent greater in working capacity than the elevator bucket. Both working and water level capacity are given in the tables on elevator buckets and tower hoppers.

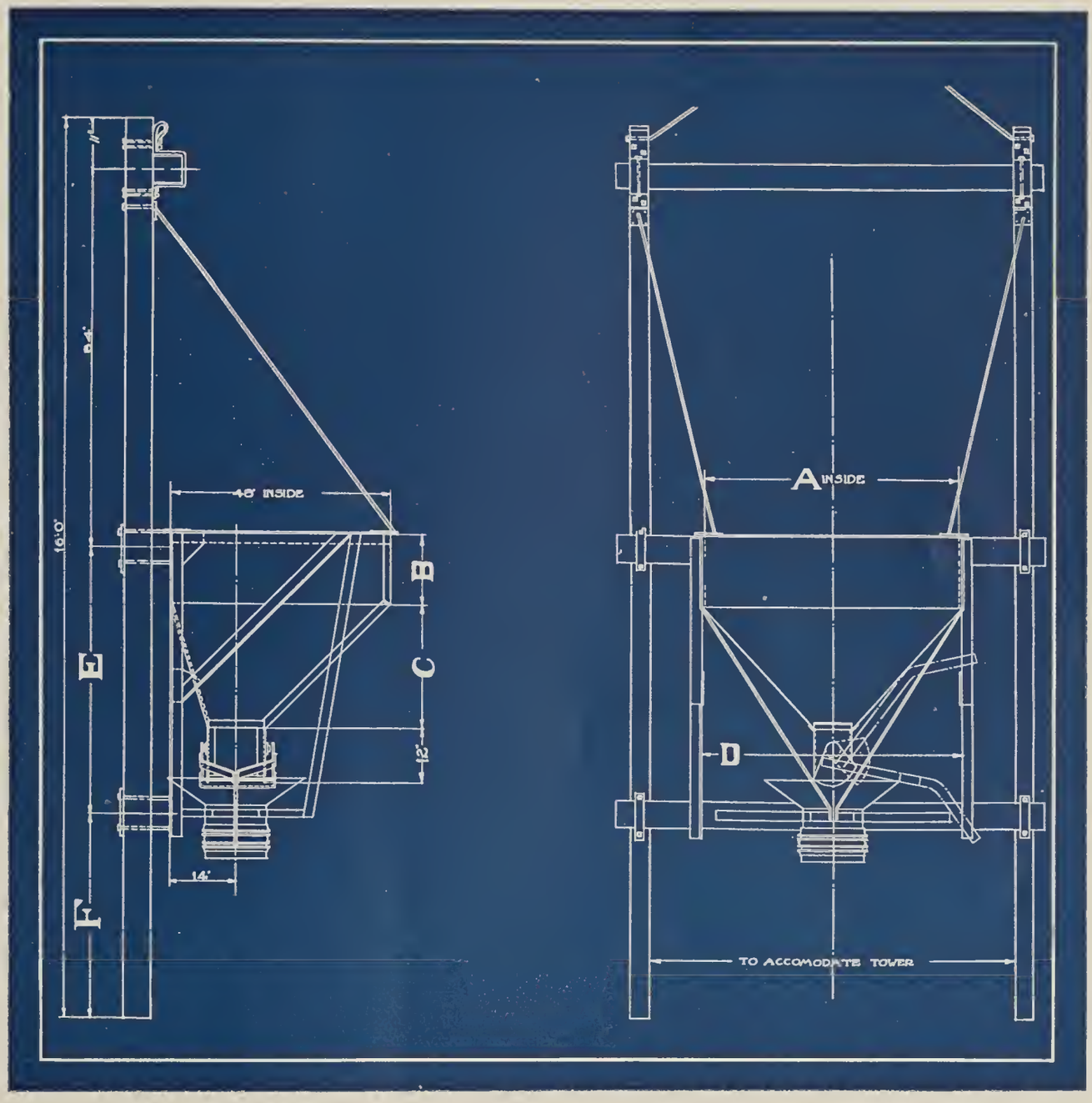
The Type "O" Tower Hopper will work with any elevator bucket which will discharge outside of the tower, but it is made particularly for use with Type "O" chute sections, as the thimble and bracket for connecting with the elbow fits up snugly under the discharge gate of the hopper. This hopper is made of 12 gauge steel for the 20 and 30 cubic foot capacities and of 10 gauge steel for the larger sizes. The top is reinforced with 2-inch angles. The sides of the hopper are sloped to fit an 8 x 12 inch radial discharge gate made of sheet steel with malleable iron sides. This gate can be operated from either side of the tower by a lever with an extension handle.

The width of the hopper remains the same for all capacities. The advantage of this is that the center of gravity of the hopper, full or empty, will be as close to the tower as possible.

Thimble and Bracket for attaching Type "O" Chute Sections and "O" Unit Plants to Tower. No. 501. Code Word *Cane*. Sliding Frame only. No. 500. Code Word *Clasp*. In ordering a thimble and bracket always state size of hopper with which it is to be used.

Type "O" Tower Hopper and Wood Sliding Frames

For Use With All Type "O" Plants On Wood Towers Except Counterweight Plants



Weights, Capacities and Dimensions

No.	Code Word	Capacity Working	Cu. Ft. Water Level	Weight	A	B	C	D	E	F
521	Cathedral	20	28	1350	56	6	30	59½	51½	45½
531	Cedar	30	40	1400	56	15	27	59½	58⅛	38⅞
541	Cypress	40	47	1560	72	12	30	75⅞	58⅛	38⅞
561	Church	60	61	1625	72	21	30	75⅞	66½	30½

Hopper gates on all sizes Tower Hoppers 8" x 12".

The Lakewood Engineering Company
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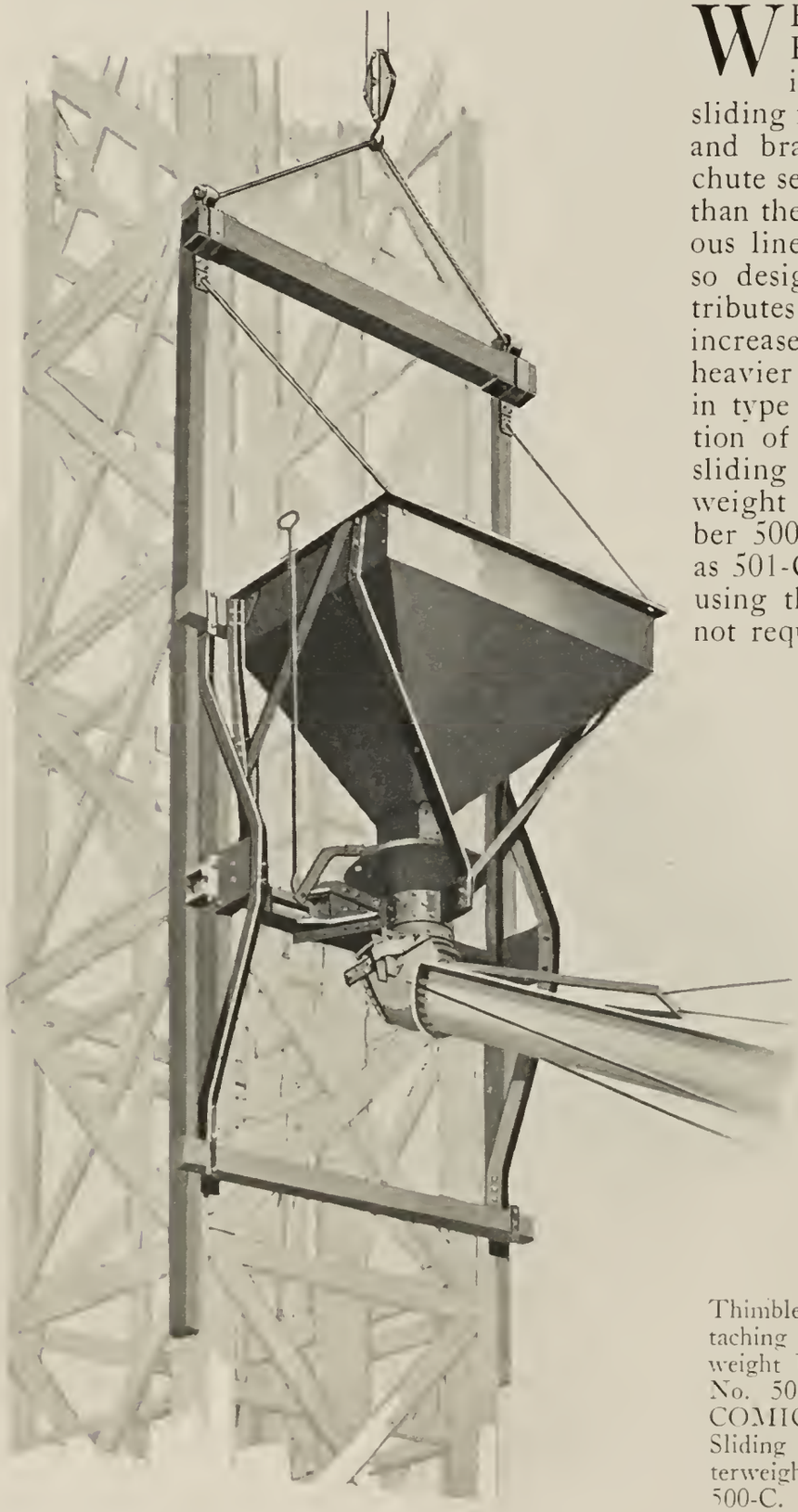
Type "O" Tower Hoppers and Wood Sliding Frames

For Use With Unit Counterweight Plants On Wood Towers



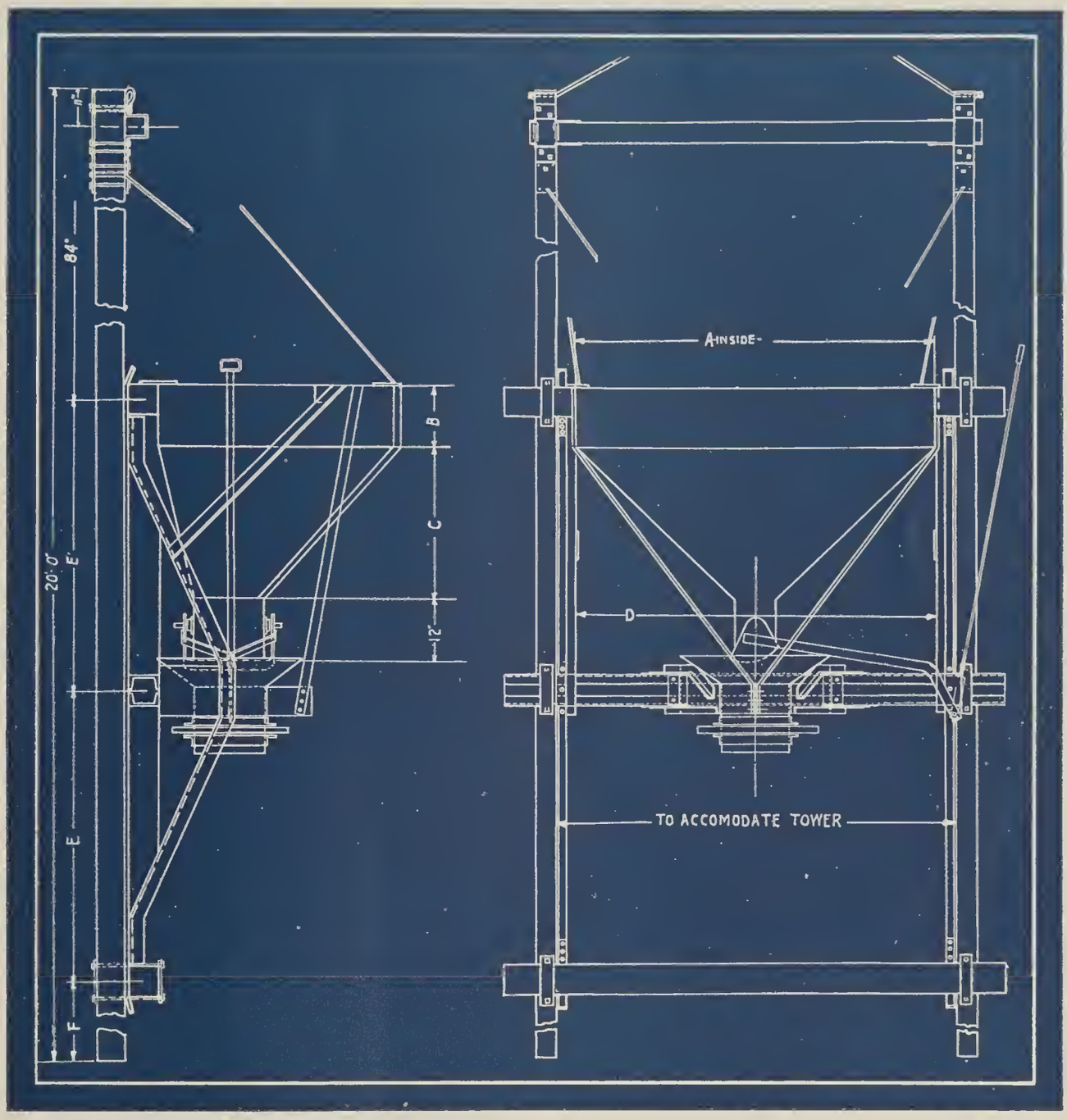
WHERE a Unit Counterweight Plant is used a reinforced sliding frame is required. This sliding frame is longer and the thimble and bracket for connecting with the chute section is much heavier in design than the one used with unit or continuous line plants. In other words, it is so designed that it receives and distributes more evenly over the tower the increased thrust due to the use of heavier chute sections. The distinction in type numbers is made by the addition of the letter C. For example, a sliding frame for a Unit Counterweight Plant is designated by the number 500-C. The thimble and bracket as 501-C. A unit counterweight plant using the CL 2030 or CL 3030 does not require this type of sliding frame.

Thimble and Bracket for attaching Type "O" Counterweight Unit Plants to Tower. No. 501-C. Code Word COMICAL.

Sliding Frame only for Counterweight Unit Plants. No. 500-C. Code Word CAFE.

Type "O" Tower Hoppers and Wood Sliding Frames

For Use With Unit Counterweight Plants On Wood Towers



Weights, Capacities and Dimensions

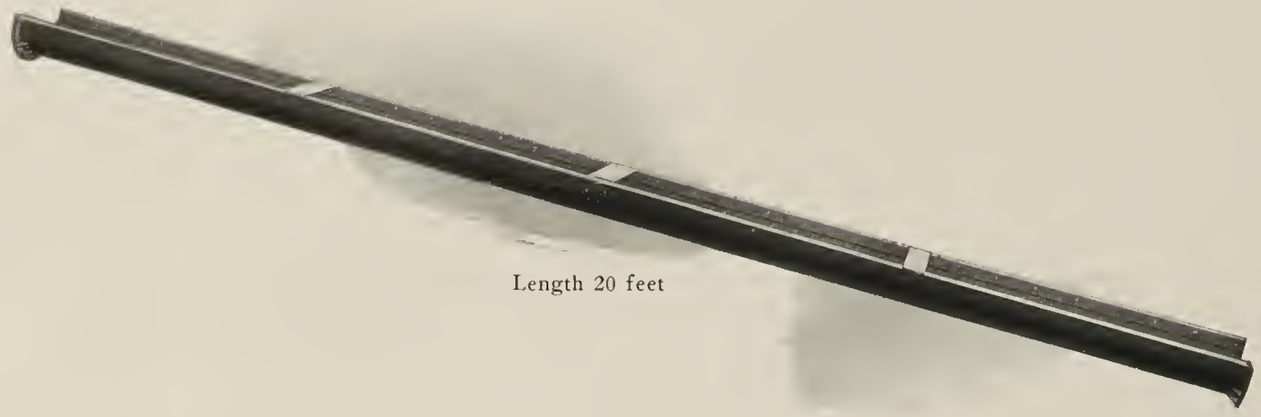
No.	Code Word	Capacity Working	Cu. Ft. Water Level	Weight	A	B	C	E	E'	F
521-C	Cimon	20	28	2180	56	6	30	51½	57½	29⅜
531-C	Cinch	30	40	2240	56	15	27	57½	58⅛	29⅜
541-C	Cipher	40	47	2400	72	12	30	57½	58⅛	29⅜
561-C	Circle	60	61	2470	72	21	30	....	....	....

Hopper gates on all sizes Tower Hoppers 8"x12".

The Lakewood Engineering Company
Cleveland, U. S. A.

Lakewood Chute Units

Length 10 feet

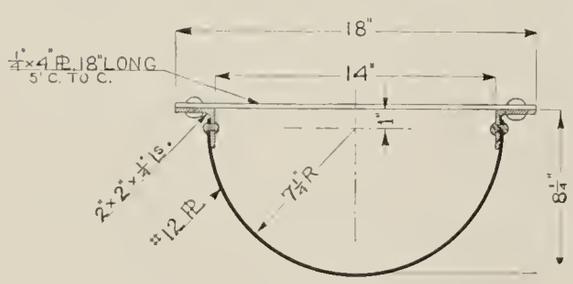


Length 20 feet

THE LAKEWOOD chute section is 14 inches wide inside and 8¼ inches deep, wide open, half round, type which offers the least frictional resistance to the flow of the concrete. Standardization of LAKEWOOD chute parts allows the manufacture and stocking of sufficient finished work to make prompt deliveries, with the further advantage to the contractor of being able to change the type of his chutes in the field, with the addition or interchange of necessary parts.

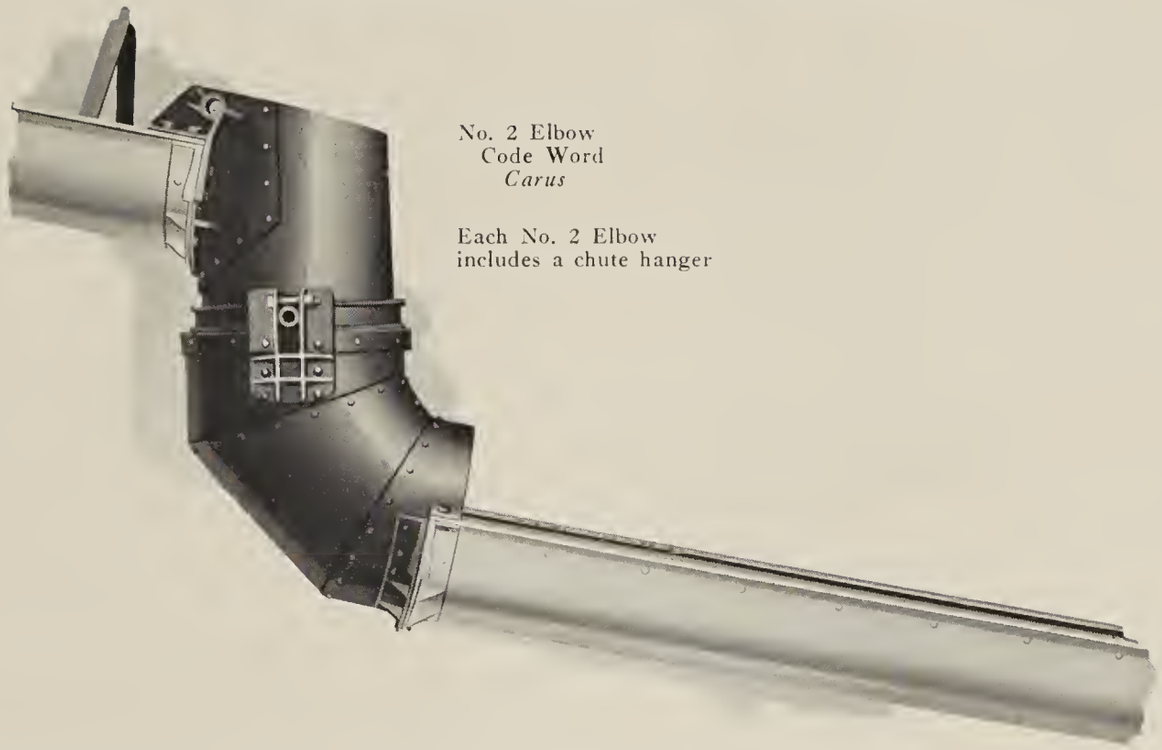
All chutes are manufactured in sections 10 and 20 feet long, of No. 12 gauge sheet.

The standard chute sections are reinforced along both sides with 2 x 2 x ¼" angles while the boom chute sections have 2½ x 2½ x $\frac{5}{16}$" angles. In both cases these angles are tied together with wide cross plates. The sheets are the wearing surface and are not depended upon for strength. Malleable iron connection flanges are riveted to the end of each chute section. Different combinations of these sections are bolted together to form sections of chute in multiples of 10 feet in length, up to 50 feet. Struts and truss rods are likewise standardized for the reinforcement of the longer sections. Either Type "O" or Type "L" in any length of chute section is assembled from standard parts. All parts are interchangeable.



Lakewood Flanged Joint bolted together.

Lakewood Type "O" Chute Connections

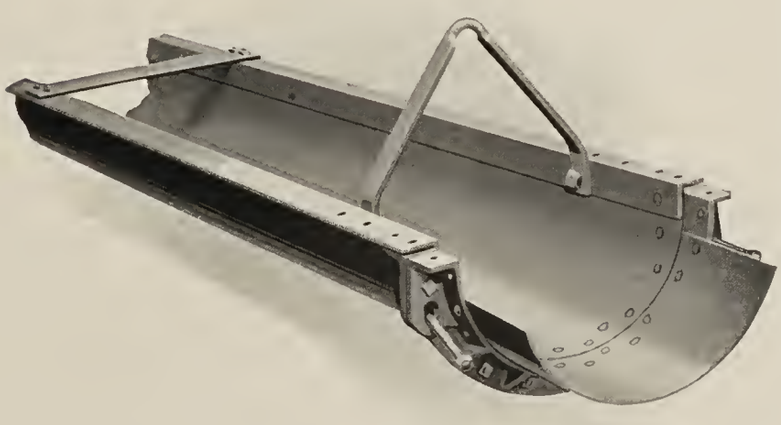


No. 2 Elbow
Code Word
Carus

Each No. 2 Elbow
includes a chute hanger

THERE are two types of chute connections. One for continuous line chute where no change in direction is required nor swiveling action necessary, and one for boom, unit and continuous line plants where swiveling is a necessary requirement. A continuous line chute connection is formed by the addition of a No. 6 joint to the discharge end of a chute section. The apron of the joint rests on the receiving end of the following chute section. The two sections are tied eogether with $\frac{5}{8}$ x $5\frac{1}{2}$" bolts passed through $\frac{7}{8}$" holes in the flanges. This joint provides the necessary flexibility for a line of continuous chute and at the same time does not interrupt the flow of the concrete.

The LAKEWOOD elbow chute connection meets every requirement where swiveling action is necessary. The No. 2 elbow is attached at the discharge end of the chute. A loose trunnion ring of cast steel with two heavy lugs rests upon a cast steel flange, bolted to the lower end of the elbow. This trunnion ring has a full circle swing. The No. 3 elbow is attached at the receiving end of the chute. The top is reinforced with steel ring. Two angle ears are riveted opposite each other and on the outside of the elbow. These ears pass up on each side of the lugs in the trunnion ring of the No. 2 elbow and a bolt passed through them over the lug, which makes the connection between the two sections of chute. On account of the two point support there is no chance for the chute to tip sideways and spill the concrete. The full circle action is obtained in the trunnion ring and vertical movement through the bolt riding on the trunnion lugs. All working parts are on the outside, leaving the inside free and open. There is no possibility of the concrete clogging. The elbows are full circle section and have twice the capacity of the chute itself.

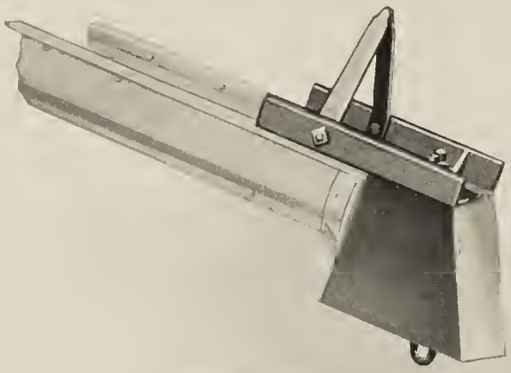


No. 6 Joint
Code Word
Clap

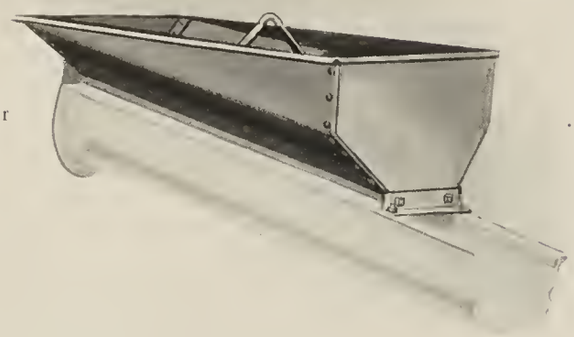
Each No. 6 joint
includes two chute hangers.
See section on continuous line chutes.

The Lakewood Engineering Company
Cleveland, U. S. A.

Lakewood Type "L" Chute Connections and Tower Hoppers

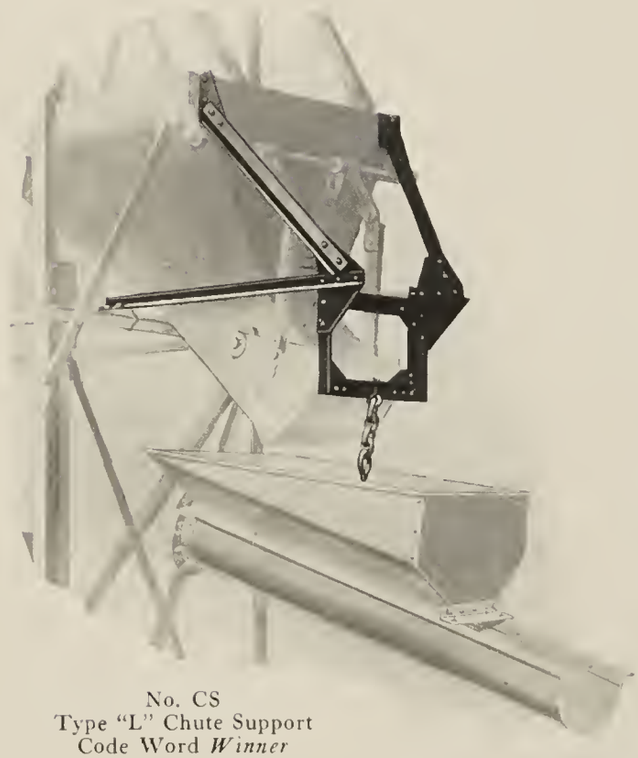


No. 5 Apron
Code Word
Cicero

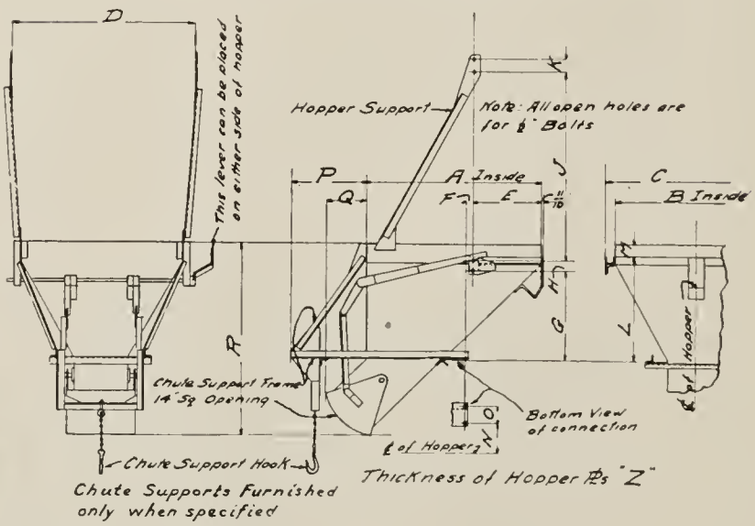


No. 4 Hopper
Code Word
Carver

WHEN Lakewood chuting equipment was first developed, the type of chute connection used was similiar to that shown on this page. The No. 5 apron is attached at the discharge end of the chute section; a heavy bolt hook passes thru it and swivels on cross angles at the top of the apron. This apron deflects the concrete into the square hopper of the following chute section. The No. 4 square hopper is attached to the receiving end of the chute section. A standard chute hanger, located about midway of the hopper, rests in the hook of the apron. Vertical movement is obtained with the rocking of the hanger in the hook and full circle swing in the swiveling of the hook. This type of connection has been largely replaced by the Type "O" Lakewood chute connection, but it is still required for replacements and additions to old Lakewood chute plants. For connecting the Type "L" section into a Type "O"; one section is used with a No. 4 hopper receiving end and No. 2 hopper, discharging end, as indiacted by the No. 3042, or if connecting a Type "O" into a Type "L", one section of the No. 3 elbow at its receiving end is used with the No. 5 apron on the discharge end as indicated by the No. 3035. All Lakewood chute sections are punched so that either Type "L" or Type "O" chute connections can be used. In using the Type "L" chute connection on the lead off chute from the hopper, it is necessary to use the Type "L" hopper of the type shown, including the chute support. This hopper is of the extended gate type and is of very heavy construction. It has a grout tight gate, 14" x 14" and is built in capacities of 14, 28, and 42 cubic feet.



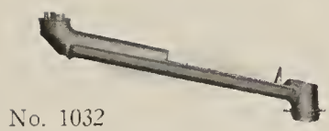
No. CS
Type "L" Chute Support
Code Word *Winner*



Dimensions No. 702 Tower Hopper

No.	Code Word	Capacity Working	Cu. Ft. Water Level	Wt.	A	B	C	D	E	F	G	H	J	N	P	Q	R
702	Wisdom	14	18	582	44¾	42	47½	48	17¼	2 1/16	23¼	3	48½	8⅜	19 13/16	10½	50½
702	Wack	28	32	765	53	54½	61¼	61¾	16⅛	2 1/16	22⅝	3	49⅛	13⅛	19 5/16	10½	59¾

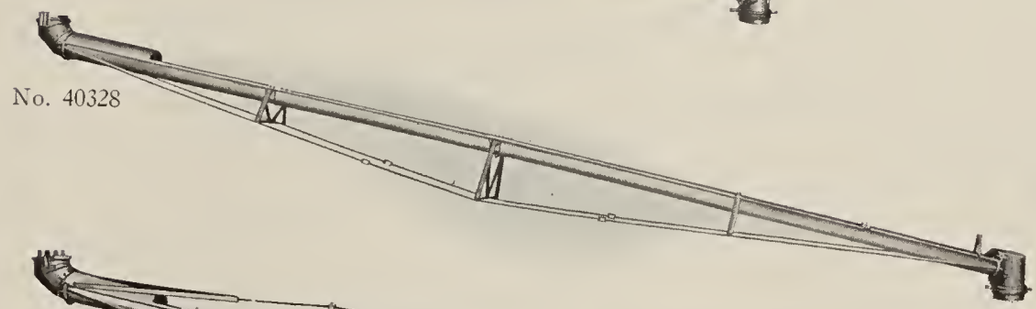
Lakewood Type "O" Standard Chute Sections



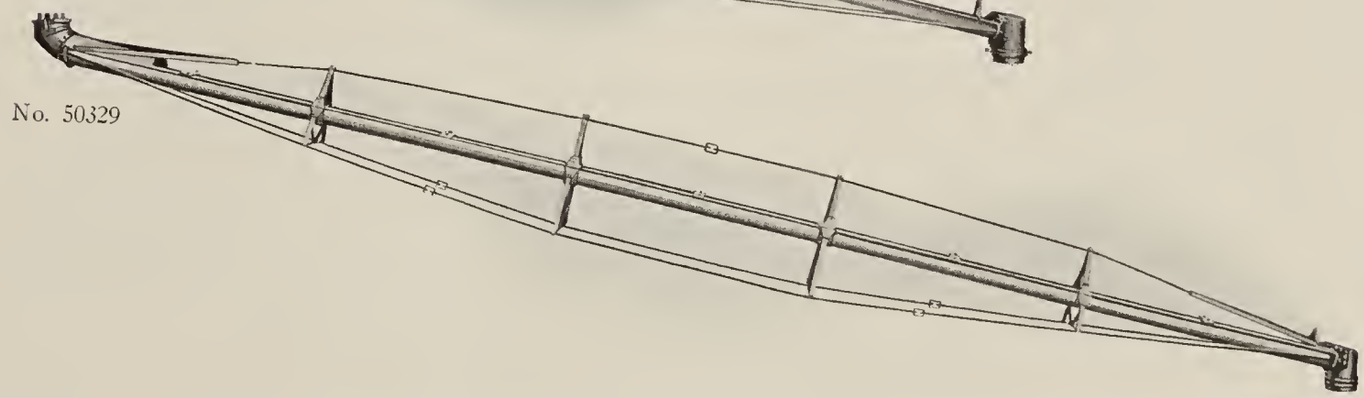
No. 1032

No. 2032

No. 3032



No. 40328



No. 50329

ALL Lakewood Chute Sections are numbered. The first two figures indicate the length, the third figure indicates the connection at the receiving end, the fourth the connection at the discharge end, and the fifth figure, if used, indicates the truss rods; thus, the No. 3032 indicates a section 30 feet long with a No. 3 elbow at the receiving end and a No. 2 elbow at the discharge end. A No. 2002 would indicate a 20 foot section with no receiving elbow and a No. 2 discharge elbow.

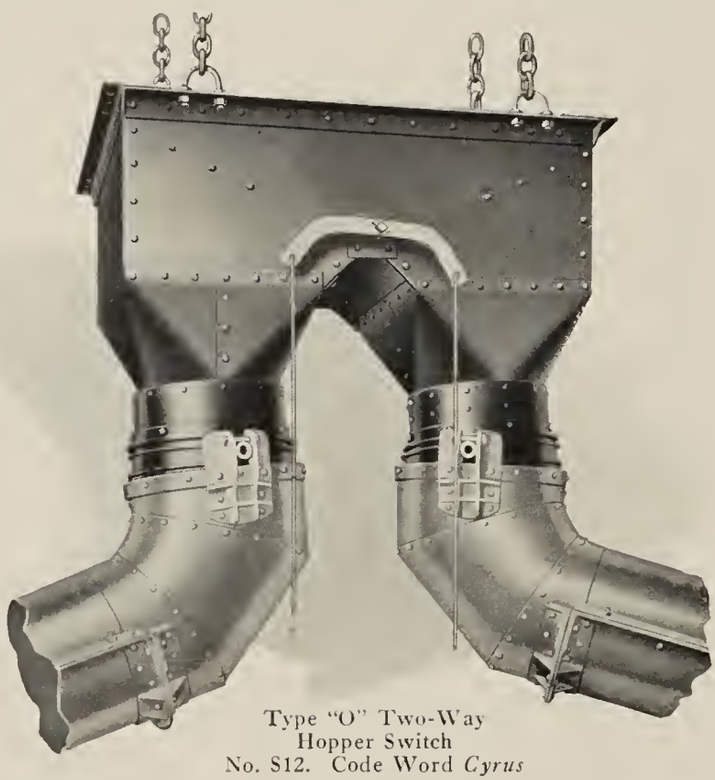
Sec.	Code Word	Length	Receiving End	Discharge End	Truss Rods	Weight
1032	Constable	10	No. 3 Elbow	No. 2 Elbow	None	341
2032	Conway	20	No. 3 Elbow	No. 2 Elbow	None	509
3032	Corday	30	No. 3 Elbow	No. 2 Elbow	None	708
40328	Cousin	40	No. 3 Elbow	No. 2 Elbow	No. 8	1063
50329	Cunard	50	No. 3 Elbow	No. 2 Elbow	No. 9	1464

Lakewood Continuous Line Chutes

THE LAKEWOOD continuous line chutes are made in lengths of ten, twenty and thirty feet, with a No. 6 joint at the discharge end. No connection is required at the receiving end as indicated by the "zero" for the third figure in the section numbers.

Continuous line chutes are suspended from overhead cables. It is general practice to use a 6 inch double wood block above and 6 inch single wood block below. Three-quarter inch hemp rope is preferred, as it is much easier in the hands of the workmen and stretches less than smaller rope under the strain Trolleys can be used to very good advantage on the suspended cable for support of the blocks. When trolleys are used the chutes can be run out on the cable from one end of the line with a line from the hoisting engine.

The suspending cable should not be stretched tight, as this puts a strain on the cable, in addition to the load of the chute. See table on page 54 for the size of suspension cable for continuous line chute plants, etc.

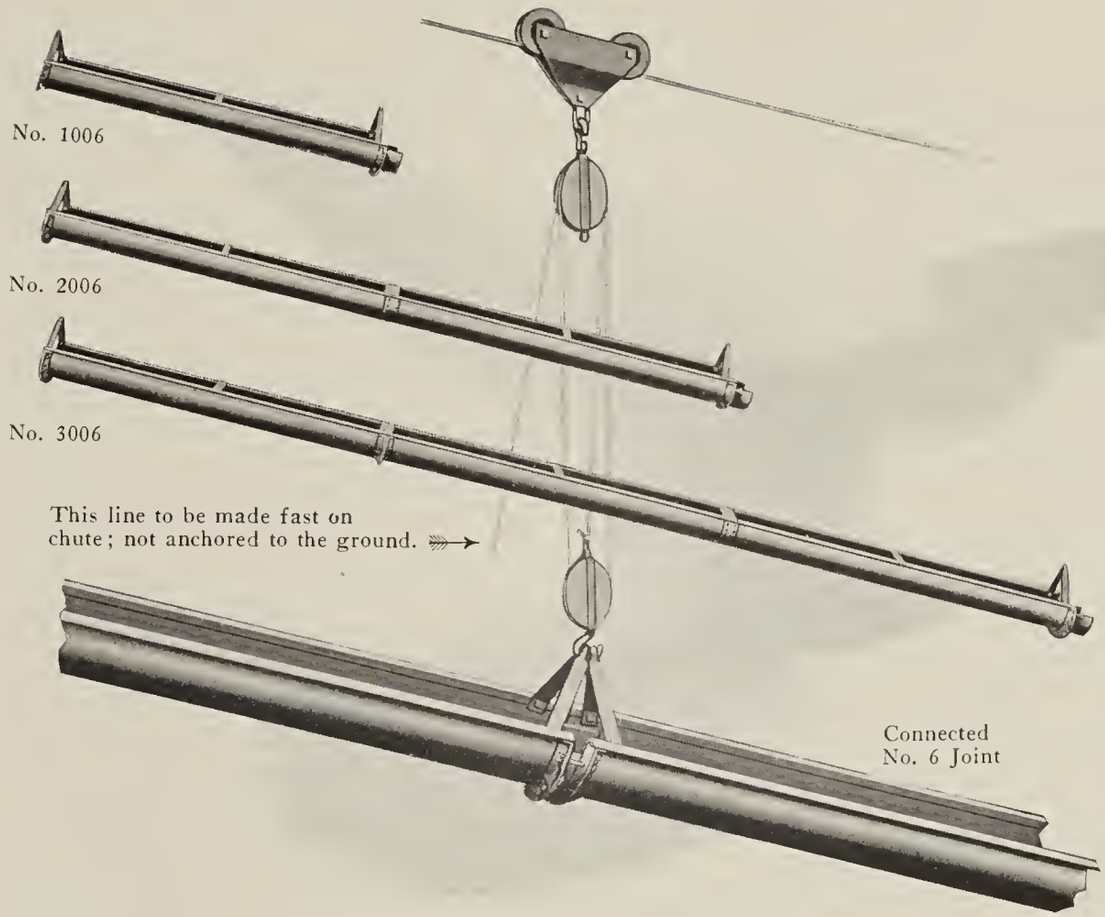


Type "O" Two-Way
Hopper Switch
No. S12. Code Word *Cyrus*

Wherever it is necessary to distribute concrete in two directions from the tower hopper, using continuous line chute a Type "O" two-way hopper switch is required. This switch is fastened underneath the tower hopper and the continuous line chute elbows are connected to it as shown in the cut.

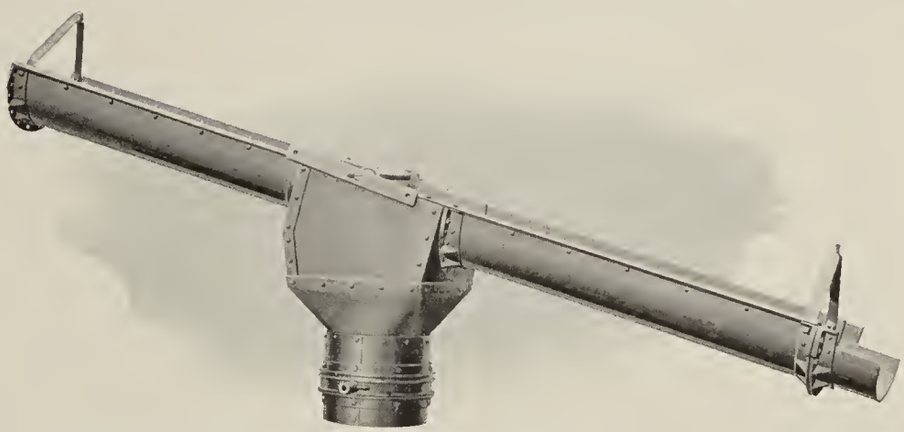
If concrete is to be distributed at two or more points from the same continuous line chute, a line gate, as shown on the opposite page, must be placed in the line. Additional chute can be attached to the line gate or a flexible chute hopper can be attached and the concrete dropped to the forms. This line gate is built into the center of a 10 ft. standard chute. To the bottom is fastened a standard trunnion ring for attaching an elbow or a round flexible chute hopper, as the case may be. It is necessary when using a line gate to support it to the overhead cable from both ends. Hangers are provided for this purpose and a No. 6 chute connection is always included.

Lakewood Continuous Line Chutes



No. L. G. 106

The No. 6 joint should not be drawn up tight.

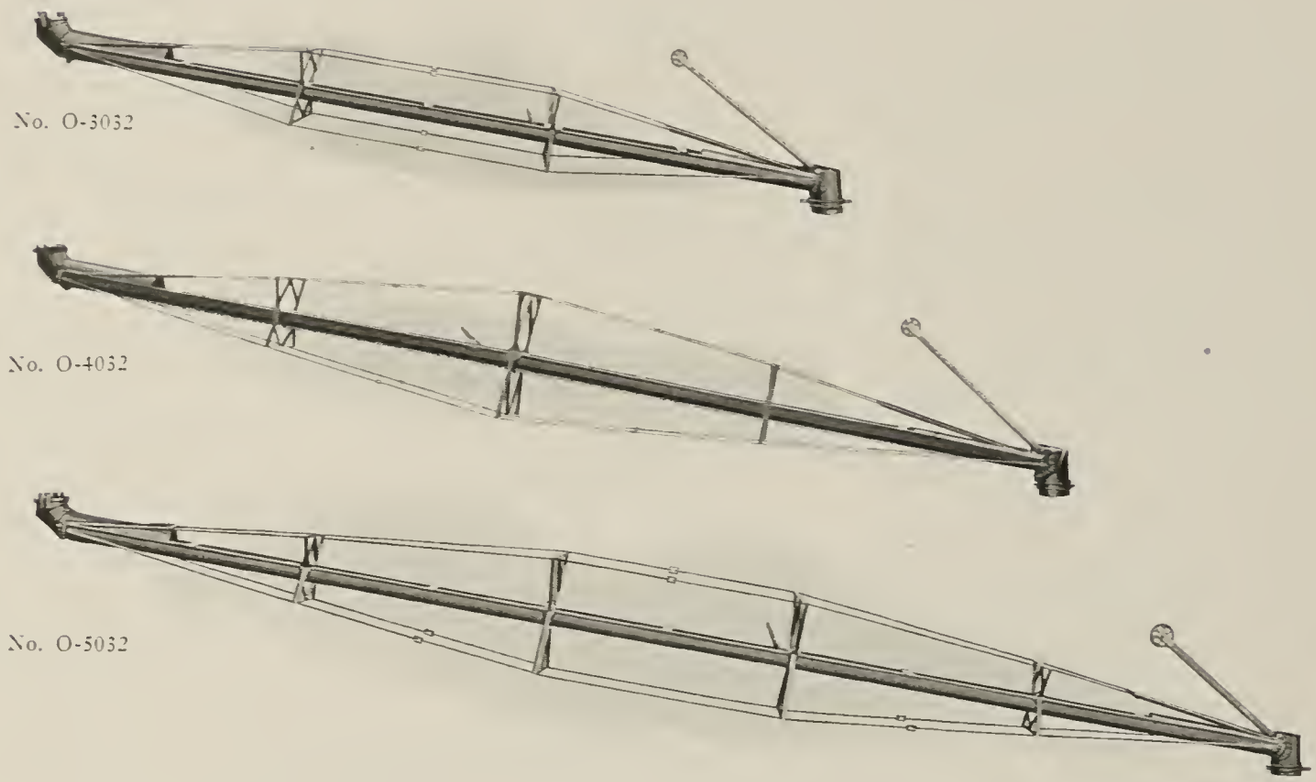


Section	Code Word	Length	Receiving End	Discharge End	Truss Rods	Weight
006	Casket	20 ft.	Flange	No. 6 Joint	None	211
2006	Carp	10 ft.	Flange	No. 6 Joint	None	379
3006	Castle	30 ft.	Flange	No. 6 Joint	None	577
LG-106	Crux	10 ft.	Flange	No. 6 Joint	None	322

The Lakewood Engineering Company
Cleveland, U. S. A.

Lakewood Type "O" Boom Sections

For Type "O" Unit Plants



LAKEWOOD boom chute sections are the first sections of chute in the unit or unit-counterweight plants. They are designed for greater strength than the standard trussed sections, the trussing and size of angle on the chute being considerably heavier. These boom chute sections are made in 20, 30, 40 and 50 foot lengths for use with the various sizes of plants.

When used with unit plants, or with plants using a CL-2030, or CL-3030 counterweight, the receiving elbow of the boom section is a 3-R and the discharge elbow a plain No. 2. When used with the heavier 30 or 50 foot counterweights, the receiving elbow is a 3-H and the discharge elbow a 2-H. These various elbows are consistent in strength to the type of plant with which they are to be used.

To provide great range in the size of counterweight plants, Lakewood counterweight chutes are made in 20, 30 and 50 foot sizes, and in two types, heavy and light. There are, of course, special applications for each type, which will be briefly outlined.

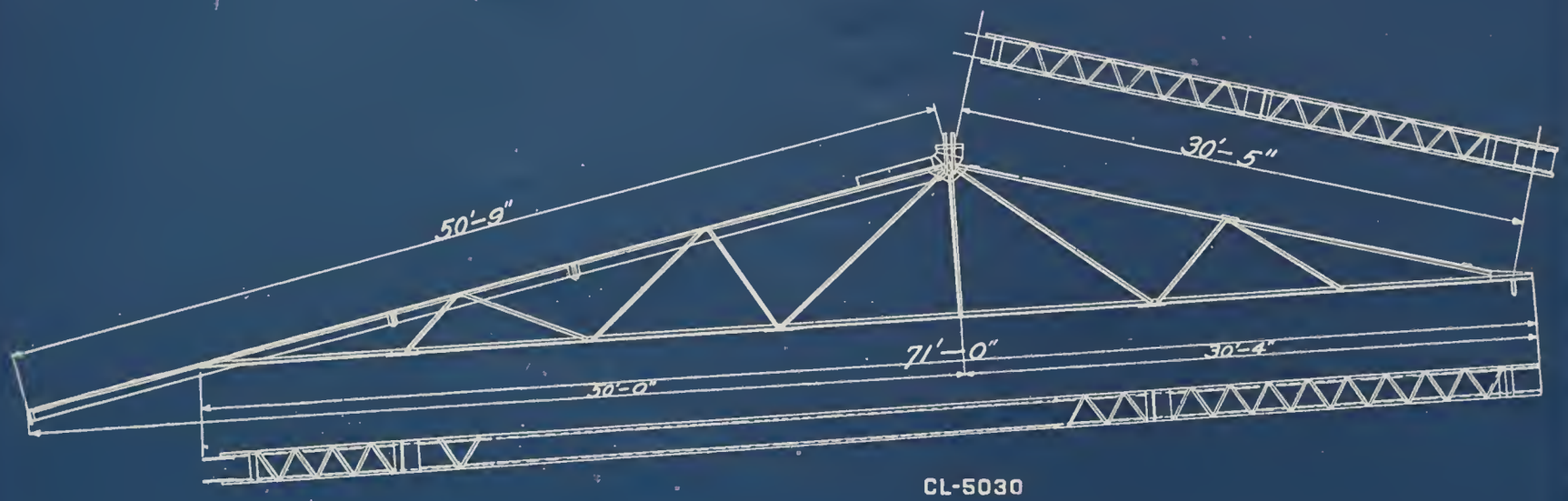
The CL-2030 and CL-3030 chutes are counter balanced distributing chutes. By means of the bracket which can be attached to any standard 20 or 30 foot section, the chute may be counterbalanced for its own weight empty. When pouring, or when additional sections are attached to it, the CL-2030, or CL-3030 must always be supported at the discharge end.

(Continued)

Lakewood 50 Ft. Heavy Counterweight

Weights Required for Counterbalancing Counterweight Chute Section No. C-5032

Equipment	Weight of counterweight in lbs. when chute is empty	These weights to be used in counterweight box.	Inside dimensions of box using 2 inch lumber and dry sand at 100 lbs. per cu. ft. when chute is empty			Weights required at counterweight end with chute full of concrete at 40 lbs. per running foot	
			Width	Length	Height		
C-5030 Only	500		3'0"	3'0"	1'0"	1800 lbs.	
C-5032 Only	595		3'0"	3'0"	1'0"	1895 lbs.	
C-5032 With No. 2030	885		3'0"	3'0"	1'0"	2705 lbs.	Those weights are for information only when estimating strain on tying down end or supports and are not to be placed in counterweight box.
C-5032 With No. 3030	1076		3'0"	3'0"	1'6"	3166 lbs.	
C-5032 With No. 40308	1310		3'0"	3'0"	1'6"	3662 lbs.	
C-5032 With No. 50309	1574		3'0"	3'0"	2'0"	4174 lbs.	
C-5032 With No. CL-2030	1260		3'0"	3'0"	1'6"	3086 lbs.	
C-5032 With No. CL-3030	1810		3'0"	3'0"	2'0"	3900 lbs.	
C-5032 With No. CL-5030	Too Heavy		—	—	—	Not Recommended	

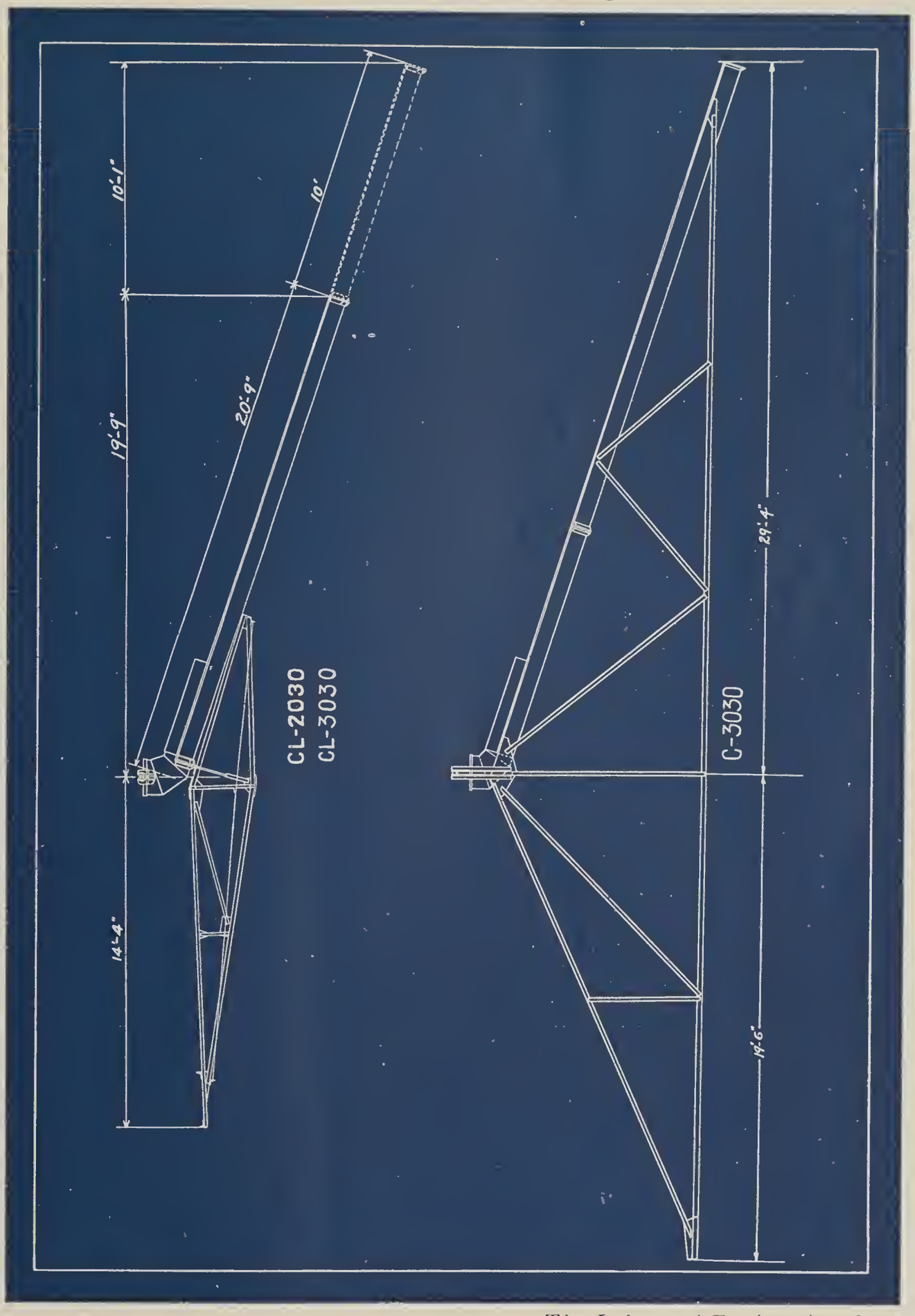


CL-5030

Weights Required for Counterbalancing Counterweight Chute Section No. CL-5030

Equipment	Weight of counterweight in lbs. when chute is empty.	Inside dimensions of box using 2 inch lumber and dry sand at 100 lbs. per cu. ft. when chute is empty		
		Width	Length	Height
CL-5030 Only	678	3'0"	3'0"	1'0"
CL-5032 With Chute Section No. 2030	1156	3'0"	3'0"	1'6"
CL-5032 With Chute Section No. 3030	1372	3'0"	3'0"	1'6"
CL-5032 With Chute Section No. CL-2030	Too Heavy	—	—	—
CL-5032 With Chute Section No. CL-3030	Too Heavy	—	—	—
CL-5032 With Chute Section No. 40308	1654	3'0"	3'0"	2'0"
CL-5032 With Chute Section No. 50309	1971	3'0"	3'0"	2'6"

Lakewood 30 Ft. Counterweight Sections



The Lakewood Engineering Company
Cleveland, U. S. A.

Lakewood Counterweight Chutes
(Continued)

The C-3030 is a heavy type 30-ft. counterweight. When used on a steel tower, with any type of plant, it may be tied down when pouring, if used alone or with a 30-ft. chute attached, or it may be counterweighted to support as much as a 50-ft. section when not pouring; but, in a tied down condition, either on a boom, unit or continuous line plant, it must not have a greater load than one thirty foot length of chute.

The CL-5030 counterweight should never be tied down under any circumstances when pouring, on either wood or steel towers. It can be counterweighted enough to support an additional 50-ft. section when empty, but should always be supported at the discharge end when pouring concrete.

The C-5030 is designed principally for use in continuous line or mast hopper plants where it is supported by a derrick. However, with a boom counterweight plant on a steel tower of the No. 732 type, it may be used tied down, supporting an additional 30-ft. chute when pouring concrete.

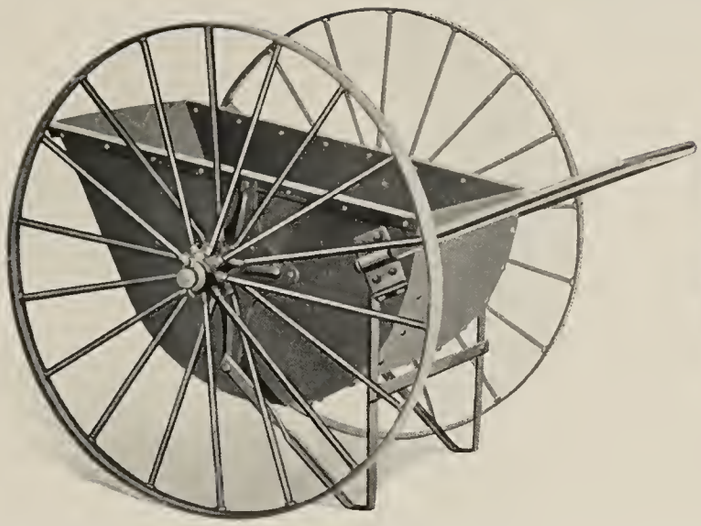
The XC-5032 or extra heavy counterweight is designed only for double counterweight plant installations on continuous line or derrick supported plants. It may be tied down supporting a CL-5032 when pouring concrete, but the discharge end of the light 50-ft. counterweight must be supported, when pouring, for it never is to be tied down under any circumstances. This section is not to be used with boom or unit plants.

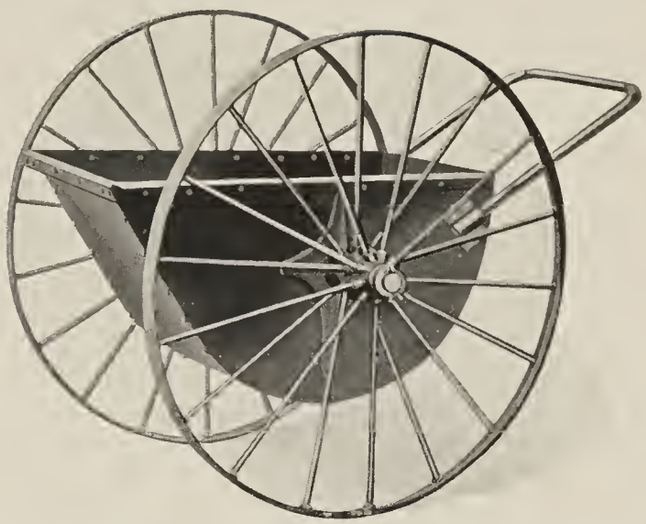
Counterweight chutes are made up of standard chute sections with truss or bracket attached, depending on the size. Complete tables are given for each size of counterweight showing size of counterweight block required for various conditions when the chute is empty. The counterweight block should not be set on top of the truss but should be suspended below from the hanger provided for that purpose.

Weights Required for Counterbalancing Counterweight Chute Sections Nos. CL-2030, CL-3030, and C-3030

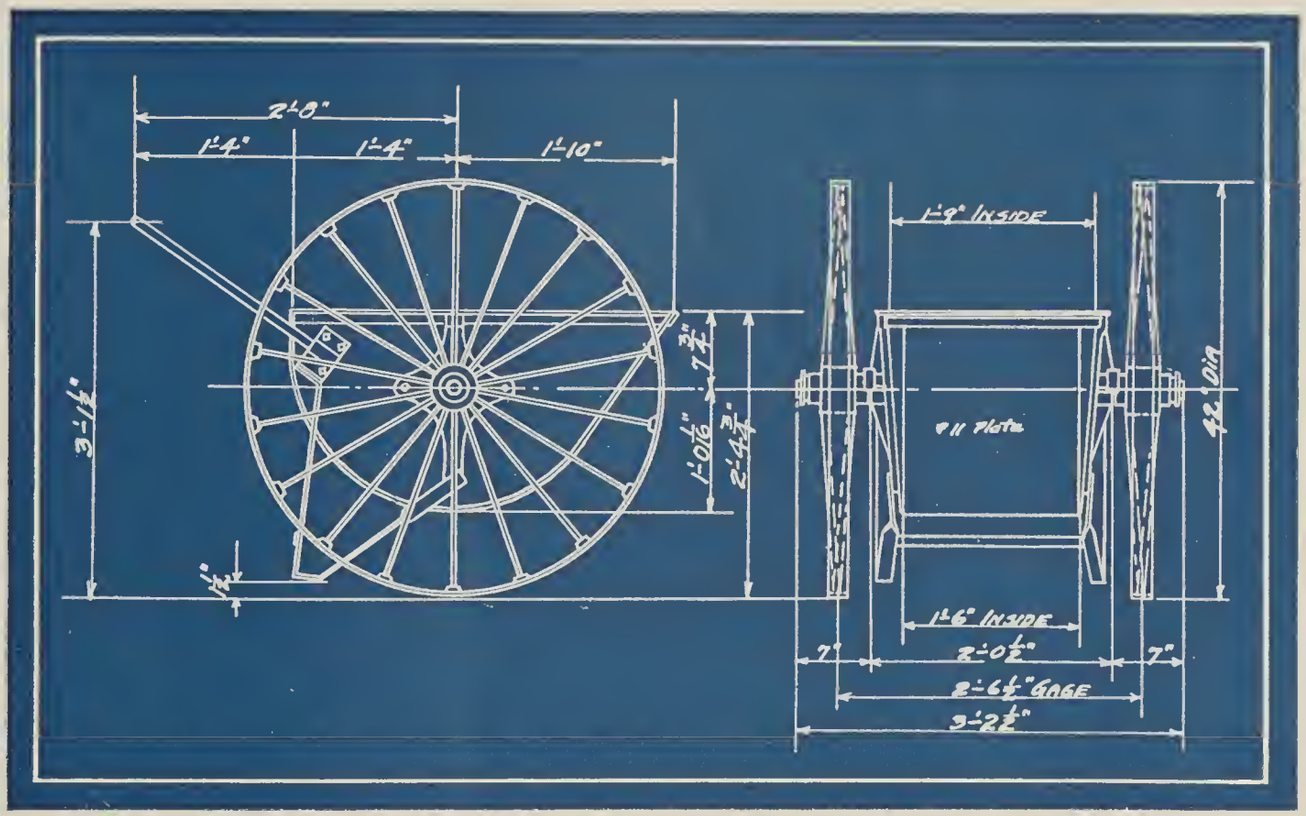
Equipment	Weight of Counterweight in Lbs. When Chute is Empty	Inside Dimensions of Box Using 2 Inch Lumber and Dry Sand at 100 Lbs. per Cu. Ft. when Chute is Empty		
		Width	Length	Height
CL-2030 Only	205	1′ 10″	2′ 2″	1′ 0″
CL-3030 Only	447	1′ 10″	2′ 2″	1′ 6″
C-3030 Only	433	1′ 10″	2′ 2″	1′ 6″
C-3030 with No. 2030	892	2′ 0″	2′ 0″	2′ 3″
C-3030 with No. 3030	1116	2′ 6″	2′ 6″	2′ 0″
C-3030 with CL-2030	1385	2′ 6″	2′ 6″	2′ 6″
C-3030 with CL-3030	2110	3′ 0″	3′ 0″	2′ 6″

Lakewood Concrete Carts





THE Lakewood Concrete Cart has a capacity of 6 cubic feet of material and can be furnished with or without legs as desired. The bottom and sides of the cart are constructed of No. 11 gauge plate. In order to secure complete discharge the corners are rounded where the bottom plate is riveted to the flaring sides. The top of the body is reinforced with a heavy angle. The axles are pressed into star shaped malleable iron trunnions which are bolted to the side of the cart, adding strength and reducing the chance of bent axles. The elimination of the long axle through the body makes possible complete and unobstructed discharge. Large diameter wheels with wide tread permits easier travel over rough surfaces. The Lakewood concrete cart was designed for maximum strength with minimum weight and absolutely meets the requirements of the job. It can be equipped with 42″ or 36″ diameter wheels.



No.	Code Word	Description	Capacity	Weight 42″ Wheel	Weight 36″ Wheel
239	Vine	Without legs	6 cu. ft.	280	250
240	Vial	With legs	6 cu. ft.	295	265

The Lakewood Engineering Company
Cleveland, U. S. A.

Lakewood Type "M" Tower Hoppers

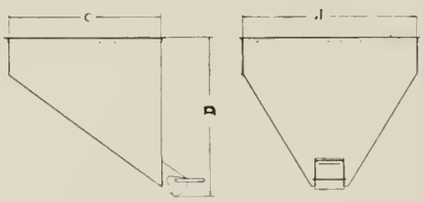
For Use with Concrete Carts Only

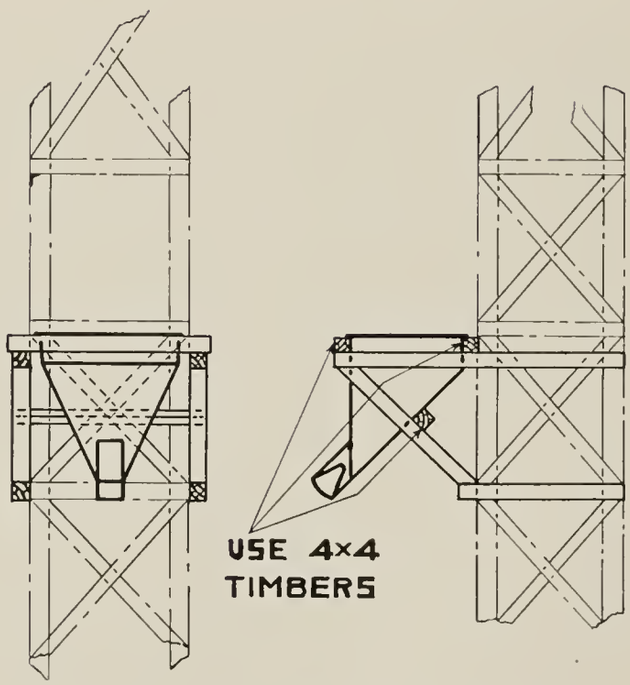
THE LAKEWOOD Type "M" Tower Hopper was designed primarily for use on jobs where the concrete is to be distributed by concrete carts. The point of discharge is well away from the tower, thus allowing ample clearance for the carts when loading. These hoppers, in the 20 and 30 cubic foot sizes, are made of 12 gauge plate, while the 40 and 60 foot sizes are of 10 gauge plate. They are all equipped with an 8″ x 12″ radial gate.

Type "M" Tower Hopper

It is impossible to connect chutes to this type of tower hopper. However, it may be mounted on a Number 500 wood sliding frame if desired, or may be attached to the tower as shown in the sketches below.

This hopper can be made into a floor hopper simply by the addition of standards, or it may be used as a charging hopper for elevator buckets in re-elevating towers, on large chuting plants.





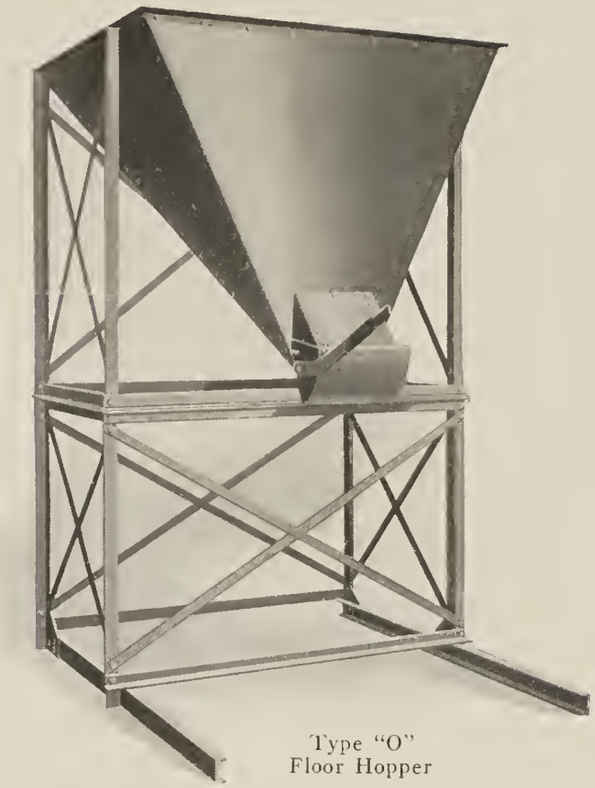
Showing method of attaching Type "M" Tower Hopper to the Tower, using timber supports.

Type "M" Tower Hopper

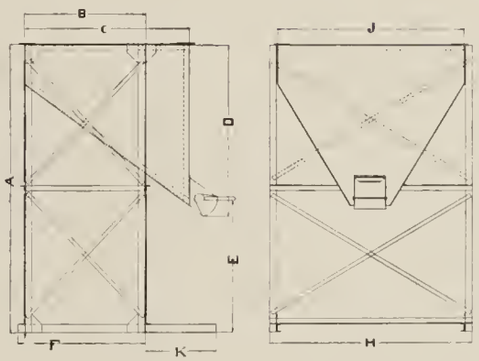
No.	Code Word	Capacity Working	Cu. Ft. Water Level	Wt.	C	D	J
124	Woman	24	27	320	48	47	56
130	Welfare	30	33	350	54	51½	56
140	Waste	40	46	521	60	56	68
160	Welt	60	65	880	60	64	68

Lakewood Type "O" Floor Hoppers

THE LAKEWOOD Floor Hopper is especially designed for holding concrete which is to be distributed with carts or wheelbarrows. It is portable, self-supporting and may be placed in any convenient location. It consists of a Type "M" tower hopper, bolted to steel standards. This construction makes it easy to erect or dismantle in the field, and allows the body to be used as a tower hopper if desired. The discharge gate of the Hopper extends out so that there is ample of clearance for charging carts or wheelbarrows as the case may be.



Type "O"
Floor Hopper



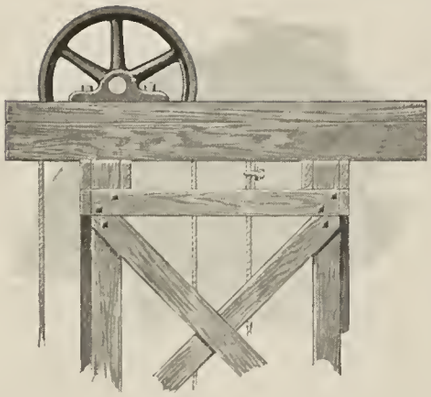
Type "O" Floor Hoppers
Weights, Capacities and Dimensions

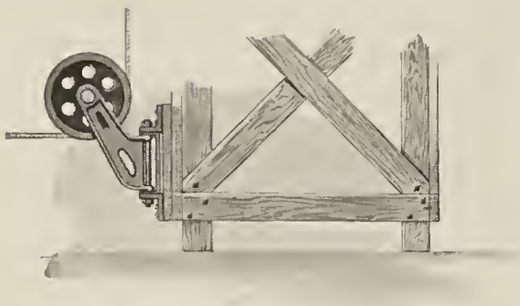
No.	Code Word	Capacity Working	Cu. Ft. Water Level	Weight	Size Gate	A	B	C	D	E	F	H	J	K
824	Wharf	24	27	715	8x12	87	32	48	47	47	34½	61	56	25½
830	Ware	30	33	785	8x12	93	38	54	51½	48	40½	61	56	25½
840	Wool	40	46	1040	8x12	97	44	60	56	48	46½	74	68	25½
860	White	60	65	1250	8x12	105	44	60	64	48	46½	74	68	25½

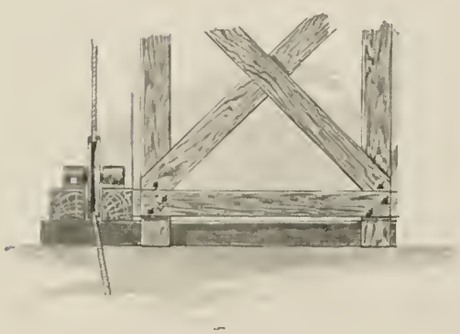
The Lakewood Engineering Company
Cleveland, U. S. A.

Lakewood Tower Sheaves

For Wood Tower







LAKEWOOD tower sheaves are designed for high speed work. The top tower sheaves are of the live pin type with bronze bushed bearing boxes. The bottom swivel sheave is bronze bushed with an unusually heavy swivel casting for support and attaching to the tower base. Details are given below.

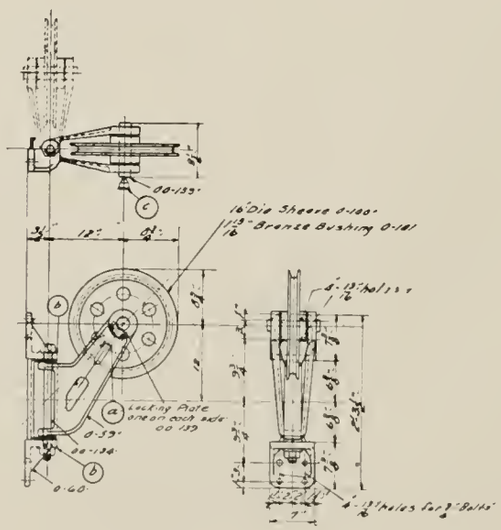
Sheaves for Top of Tower

No.	Code	Description	Size of Rope	Wt.
TS-16	Welco	2–16″ diameter sheaves and bearings	3/4″	100
TS-24	Widow	2–24″ diameter sheaves and bearings	1″	250
TS-42	Wop	1–42″ diameter sheave and bearings	1″	250

Sheaves for Bottom of Tower

No.	Code	Description	Size of Rope	Wt.
BS-16	Whistle	1–16″ diameter sheave and bearing swivel bracket	7/8″	175
BS-24	T Widam	1–24″ diameter sheave and bearings	1″	125

Dimensions are pitch diameter and not outside diameter of sheaves



Lakewood Flexible Chutes

Square Hopper for Flexible Chutes
24″ x 24″ x 36″ Long
No. 8870

Round Hopper for
Flexible Chute
16½″ Dia. x 31½″
No. 8850

FLEXIBLE chutes can be used to advantage for guiding the flow of concrete in vertical or nearly vertical lines. The connecting chains allow the twisting of sections and make it possible to lead the chute about in a circle, similar to the action of an elephant's trunk; for this reason, they are sometimes called elephant trunk chutes.

The elephant trunk sections are made in 3′ and 4′ lengths and are tapered so that the small end of one tube fits loosely into the large end of the next section, giving the necessary working clearance.

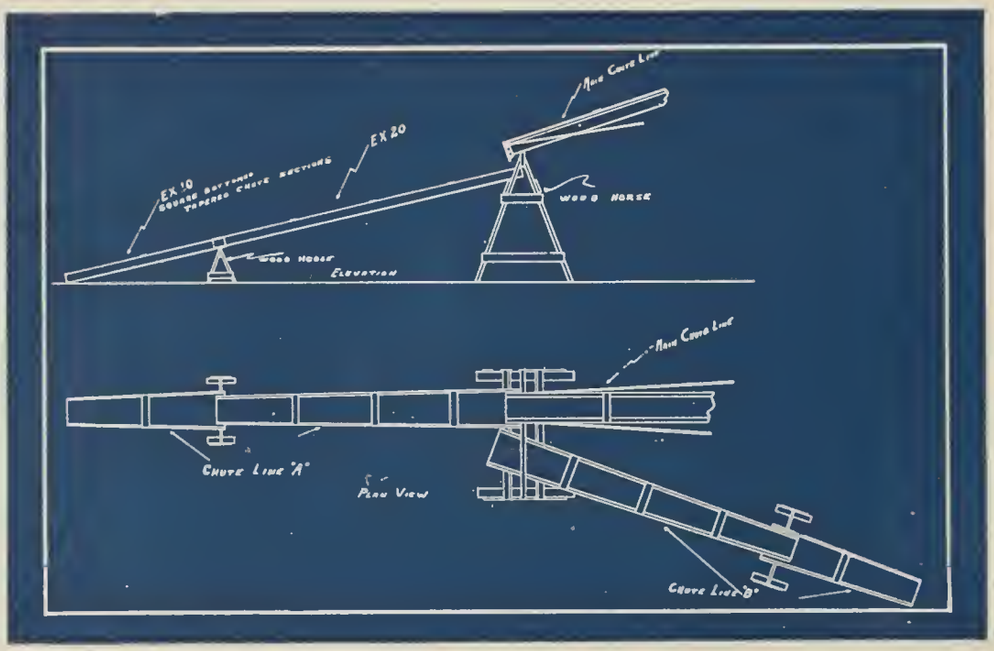
The hoppers to which these chute sections are attached, are made either round or square and can receive concrete from mixers, cars, carts, ends of the chute lines or line gates. The round hopper, No. 8850, has angle lugs on it so that it can be easily attached to the standard Type "O" elbow or line gate.

Sec.	Code Word	Length	Dia. Receiving End	Dia. Discharge End	Weight
8803	Chew	3′ 0″	10″ dia.	9″ dia.	29
8804	Chum	4′ 0″	10″ dia.	9″ dia.	39
8850	Chaucer	2′ 7½″	1′ 4½″ dia.	9″ dia.	73
8870	Cherish	3′ 0″	2′ 0″ x 2′ 0″ sq.	9″ dia.	80

Lakewood Flat Bottomed Chute Sections

No. Ex 8. Code Word *Chef*

No. Ex 16. Code Word *Cheer*

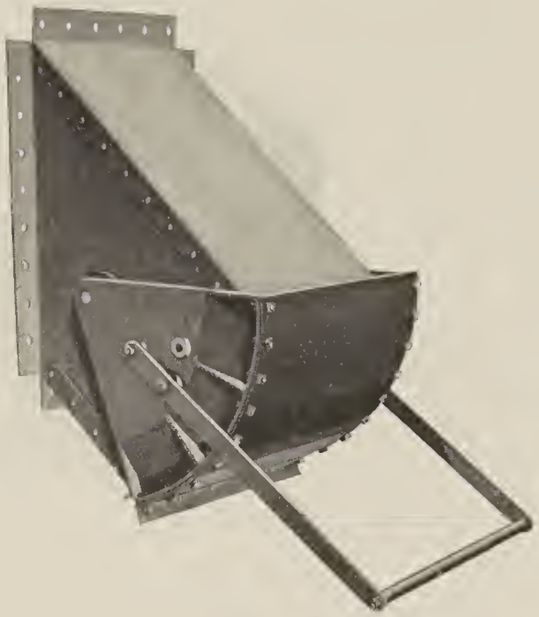


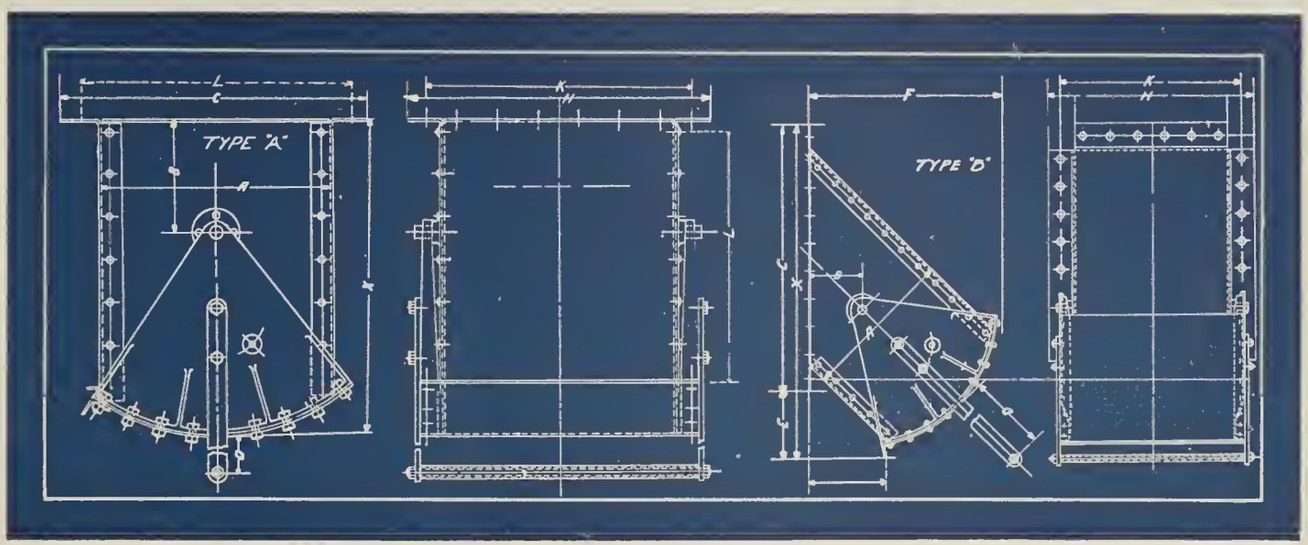
FLAT chute sections are used at the ends of main chute lines or under the discharge spout of a mixer to pour concrete directly into the forms. They can be supported on light wooden horses, which can be conveniently shifted for any desired setting. The flat chute sections are rigidly constructed of twelve gauge steel plate. Much shifting of the main chute line can be avoided by the use of these light weight chutes. They are supplied in lengths of eight and sixteen feet, tapered so that the discharge end of one chute will fit into the receiving end of the next chute.

Sec. No.	Code Word	Length	Width Inside Receiving End	Width Inside Discharge End	Depth	Weight
Ex. 8	Chef	8′ 0″	1′ 6″	1′ 2″	0′ 5″	95
Ex. 16	Cheer	16′ 0″	1′ 6″	1′ 2″	0′ 5″	180

Lakewood Bin Gates

LAKEWOOD BIN GATES are designed for attaching to the side or bottom of wood or metal material bins, hoppers or bulk heads, where loose material, such as sand, stone, gravel, ore, coal or concrete is to be discharged. These bins are made in two standard styles and sizes, of $\frac{3}{16}$″ steel plate reinforced with malleable iron castings. The maximum size of aggregate that will flow freely through the 12″ x 18″ gate, is one that will pass through a 7″ ring; the maximum size of aggregate that will flow through an 18″ x 18″ gate freely, is one that will pass through a 9″ ring. The gate proper fits snugly against the side and end plates. Special care has been taken in its construction to make them practically grout tight.





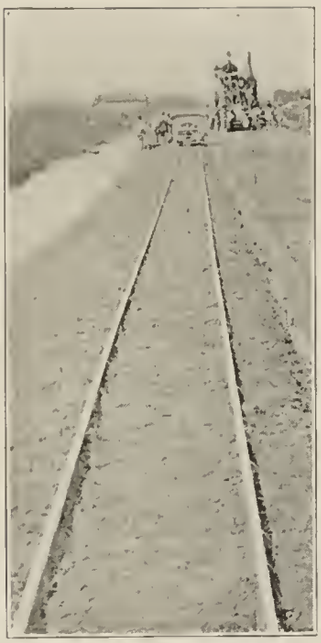
Weights and Dimensions

No.	Code Word	Size	Type	Wt.	A	B	C	D	E	F	X	H	K	L
A-12	Wae	12″x18″	A	155	1′ 0″	0′ 9″	1′ 6″	1′ 6″	.....	....	1′ 9″	2′ 0″	1′ 9″	1′ 3″
B-12	Wabe	12″x18″	B	155	1′ 0″	0′ 4⅛″	2′ 0″	1′ 6″	0′ 6″	1′ 5″	2′ 6″	2′ 0″	1′ 9″	1′ 9″
A-18	Weft	18″x18″	A	220	1′ 6″	0′ 9″	2′ 0″	1′ 6″	.....	....	2′ 1″	2′ 0″	1′ 9″	1′ 9″
B-18	Whelk	18″x18″	B	220	1′ 6″	0′ 6½″	2′ 8″	1′ 6″	0′ 8½″	2′ 0″	3′ 4½″	2′ 0″	1′ 9″	2′ 5″

Size of holes $\frac{11}{16}$″ for ⅝″ bolts

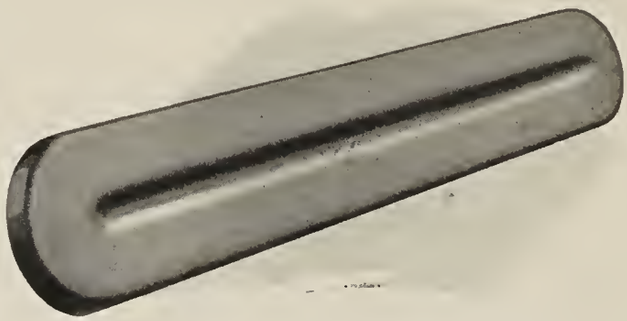
The Lakewood Engineering Company
Cleveland, U. S. A.

Lakewood Narrow Gauge Track



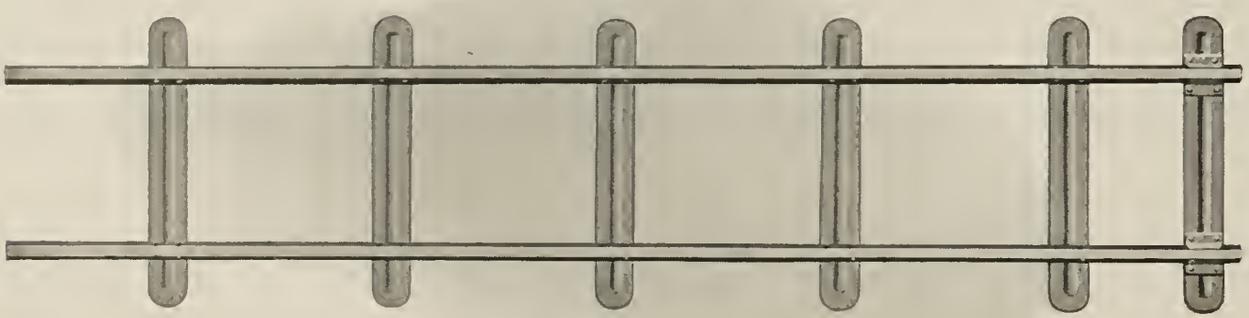
Four years old—used in six different jobs, taken up, relaid, and shipped many times yet this Lakewood Track is practically as good as new.

LAKEWOOD narrow gauge portable track is furnished in 20 or 25 lb. standard A. S. C. E. rail, in 15-ft. sections, carefully sawed to exact length. A pressed steel tie, 42″ long by 5½″ wide with a flange 1⅛″ deep around the entire edge is riveted to the rail. Standard 15-ft. sections are furnished with five or six ties depending on the loads to be carried and the soil conditions. A 15-ft. section of Lakewood track, 20 lb. rail, five ties and a joint tie weighs 307 lbs., with six ties 324 lbs. For 25-lb. rail add 50 lbs. per 15-ft. section. 60′ radius curved sections 7½′ long are standard. Switches, turnouts, etc., can be furnished to meet specific requirements. Complete details on Lakewood track for all purposes are given in bulletin No. 41.



The flange all around the Lakewood tie insures firm bearing in almost any soil

The Lakewood joint tie takes the place of 20 separate pieces and insures smooth riding over the joints
Patented December 9, 1919



Lakewood Track is amply strong to carry the loads, and yet is light enough for convenient handling. At the right end of the above section is the Lakewood Joint Tie, which is shown slipped back, ready for connecting the next section of track

Lakewood V-Dump Cars

THIS car is designed to handle bulk material, such as ashes, coal, sand, earth or crushed stone in construction or industrial plant operations. The V-dump body, because of its accurate balance, is easy to dump and the angle is such as to insure complete discharge.

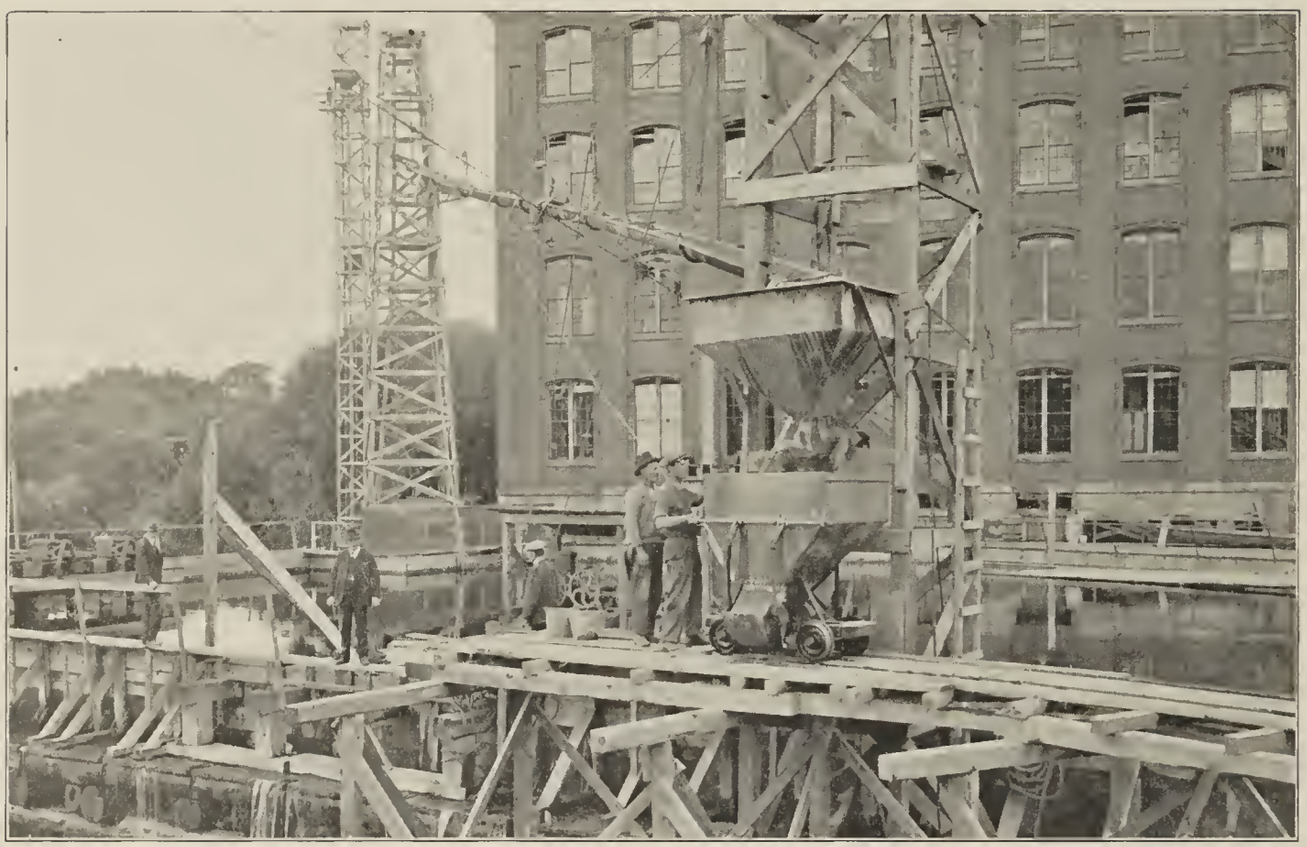
The body locking device consists of two independent latches. Raising one latch permits the body to dump only away from the raised latch, the other preventing the body from dumping towards the operator. On righting the body it automatically trips the locking latch which falls into place, holding the body in the upright position.

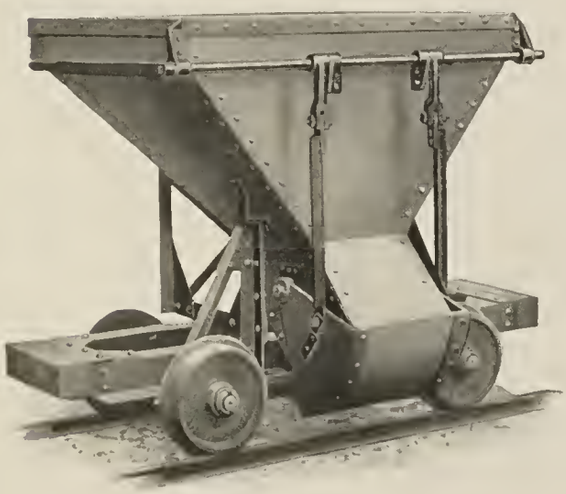
Specifications as to bearings, couplers, etc., will depend on whether cars are required for hand or locomotive haulage and will be given to suit conditions.

Capacity	1-Yard	1½-Yard	2 Yards
Length overall	7′ 8⅞″	8′ 2⅞″	8′ 10¼″
Length inside body	4′ 6¾″	5′ 1⅝″	5′ 9 7/16″
Width overall	4′ 2⅛″	4′ 9½″	5′ 5⅜″
Wheels (C. I.) chilled tread	12″	14″	14″
Wheel base	2′ 6″	3′ 0″	3′ 0″
Track gauge	24″ and 30″	24″, 30″ and 36″	36″
Weight (approx.)	1320 lbs.	1790 lbs.	2080 lbs.

The Lakewood Engineering Company
Cleveland, U. S. A.

Lakewood Radial Gate Hopper Car





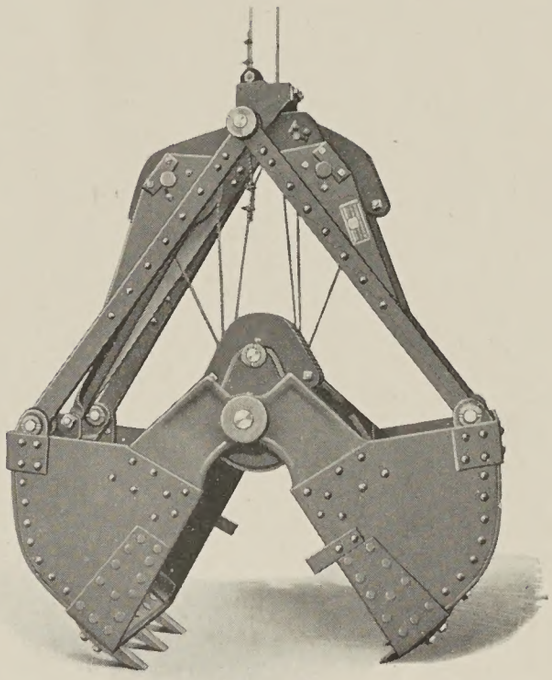
SOMETIMES occasions arise in construction work where concrete can be most advantageously handled by the use of cars. The above photograph shows a combination of chuting and cars. The concrete was chuted to a centrally located hopper from which it was taken by means of radial gate hopper cars to the forms.

The Lakewood Radial Gate Hopper car shown above, has been designed to solve just such problems. The frame is of heavy channel construction and the wheels are cast iron with chilled tread, 12″ in diameter running on 1¾″ axles with plain roller bearings. Altho not shown in the cut, link and pin couplers are provided as standard equipment.

This car is not only useful for handling concrete, but can also be used to good advantage to carry chemicals, coal, and other fine material. All dimensions are given in the table below.

Capacity Water Level	Weight Lbs.	Track Gauge	Wheel Base	Wheel Dia.	Axle Dia.	Body Plate	Body Length	Body Width	Size Gate	Overall Dimensions Height	Width	Length
24 cu. ft.	975	24″	36	12	1¾	11 Ga.	48	41	14x14	52	52½	69″
32 cu. ft.	1065	24″	36	12	1¾	11 Ga.	48	41	14x14	59½	52½	69″

Lakewood Clam Shell Buckets



LAKEWOOD Clam Shell Buckets are made in two types, the Handler and the Digger. The first is used for handling materials only. The Digger type of bucket is for more severe service and is frequently equipped with teeth for digging or handling material for which the lighter type of bucket would not be suitable.

The Handler buckets are made in sizes from one-half to two cubic yards. The Digger buckets are furnished with capacities of from three-quarters to two and one-half cubic yards. Complete details of Lakewood Clam Shell Buckets are given in a special clam shell bulletin.

LAKEWOOD DIGGER

Type	Size	Code Word	Av. Load Cu. Ft.	Water Level Cu. Ft.	Thickness of Shells	Weights Pounds	Diameter of Sheaves	Cable Size Recommended	Amount of Cable Overhauled
640	B	Dab	22	13	3/8″ Plate	2750	10″	1/2″	20′
640	C	Doubt	32	19	1/2″ Plate	3830	12″	5/8″	15′
640	D	Daper	42	27	1/2″ Plate	4500	12″	5/8″ or 3/4″	18′
640	E	Dart	59	41	1/2″ Plate	6100	14″	3/4″ or 7/8″	25′
640	F	Dean	74	54	1/2″ Plate	7100	14″	7/8″	27′

LAKEWOOD HANDLER

641	A	Dado	15	10	1/4″ Plate	2170	10″	1/2″	13′
641	B	Darius	22	13	1/4″ Plate	2530	10″	1/2″	20′
641	C	Dorcius	32	19	3/8″ Plate	3350	12″	5/8″	15′
641	D	Dagon	40	27	3/8″ Plate	3900	12″	5/8″ or 3/4″	18′

The Lakewood Engineering Company
Cleveland, U. S. A.

Miscellaneous Tables

Table Giving Sizes of Cable for Continuous Chute Lines

Diameter of Cable	Span 100 Ft.	200 Ft.	300 Ft.	400 Ft.	500 Ft.	600 Ft.	700 Ft.	800 Ft.	900 Ft.	1000 Ft.
	Safe Uniform Load in Pounds for 6x19 Plow Steel Based on Sag 8 Percent of the Span									
½	2521	2482	2443	2404	2365	2326	2287	2248	2209	2170
⅝	3906	3844	3782	3720	3658	3596	3534	3472	3410	3348
¾	5799	5710	5621	5532	5443	5354	5265	5176	5087	4998
⅞	7304	7184	7064	6944	6824	6704	6584	6464	6344	6224
1	9570	9412	9224	9096	8938	8780	8622	8464	8306	8148
1⅛	11832	11632	11432	11232	11032	10832	10632	10432	10322	10032
1¼	15115	14870	14625	14380	14132	13890	13645	13400	13155	12910
1⅜	17620	17320	17020	16720	16420	16120	15820	15520	15220	14920
1½	20125	19770	19415	19060	18705	18350	17995	17640	17285	16930
1⅝	23905	23490	23075	22660	22245	21830	21415	21000	20585	20170
1¾	27675	27190	26705	26220	25735	25250	24765	24280	23795	23310
1⅞	31445	30890	30335	29780	29225	28670	28115	27560	27005	26450
2	35210	34580	33950	33320	32690	32060	31430	30800	30170	29540
2¼	46560	45760	44960	44160	43360	42560	41760	40960	40160	39360
2½	57895	56910	55925	54940	53955	52970	51985	51000	50015	49030
2¾	69205	68010	66815	65620	64025	63230	62035	60840	59645	58450

Capacity of cable varies directly as sag—i. e. 12% sag increases capacity 50% over 8% sag. Stress due to the weight of cable itself has been considered in compiling these tables.

Factor of Safety 5.

EXAMPLE

Assume chute line 280 feet long with one line gate with ninety feet of chute attached to it. Distance between tail tower and main tower 380 feet. Assume ¾-yard mixer being used. Maximum possible live load two 21 cu. ft. batches concrete in this case.

Under no circumstances figure live load more than 50 lbs. per lineal foot.

Deadload-weight of Lakewood continues line chutes including rope and blocks may be taken as 22 lbs. per lineal foot. Weight of chute on line gate should be doubled when figuring size of cable.

Computations—

Dead load	280x22	=	6,160 lbs. weight of chute line.
	Line Gate	=	350 lbs. weight of line gate.
	90x2x22	=	4,060 lbs. weight of chutes on line gate.
D. L.	Total	=	10,570
Live load	42x150	=	6,300
	Total	=	16,870 lbs.

Referring to table on 6x19 P. S. Cable 400 ft. span, 16,870 lbs. require 1⅜ cable.

Wire Rope Table

Diameter of Rope	Weight per Foot	Breaking Load Tons	6x19 Plow Steel Safe Working Load in Tons Factor of Safety 5	Breaking Load Tons	6x19 Crucible Cast Steel Safe Working Load in Tons Factor of Safety 5
⅜	.22	5.75	1.15	5.30	1.06
½	.39	10.00	2.00	9.20	1.84
⅝	.62	15.50	3.10	14.00	2.80
¾	.89	23.	4.60	20.20	4.04
⅞	1.20	29.	5.80	26.	5.20
1	1.58	38.	7.60	34.	6.80
1⅛	2.00	47.	9.40	43.	8.60
1¼	2.45	58.	12.	53.	10.60
1⅜	3.00	72.	14.	64.	12.80
1½	3.55	82.	16.	73.	14.60
1⅝	4.15	94.	19.	83.	16.60
1¾	4.85	112.	22.	99.	19.80
1⅞	5.55	127.	25.	112.	22.40
2	6.30	140.	28.	123.	24.60
2¼	8.00	186.	37.	160.	32.00
2½	9.85	229.	46.	200.	40.00
2¾	11.95	275.	55.	243.	48.60

Manila Rope Table

Dia. Inches	No. of Feet in 1 Lb.	Coils		Breaking Load of New Rope in Lbs.	Proper Working Load Factor of Safety 5
		Length Feet	Weight Lbs.		
¾	6.3	1200	190	4700	940
1	3.7	1200	325	7500	1500
1½	1.68	1200	715	17000	3400
2	.94	1200	1275	30000	6000

AVERY CLASSICS